



FRIDAY, JULY 24.

## Train Accidents in June.

The following accidents to trains are included in our record for the month of June:

## COLLISIONS.

## REAR.

1st, a. m., passenger train on Lehigh Valley ran into rear of freight near Penn Haven, Pa., damaging several cars.

1st, night, passenger on East Tennessee, Virginia & Georgia ran over a misplaced switch into freight standing on siding in Cohutta, Tenn. Engine and several cars were badly damaged.

2d, a. m., freight on New York, Lake Erie & Western broke in two near Guyard, N. Y., and rear section ran into forward one, wrecking several cars.

2d, night, freight on Pittsburgh, Ft. Wayne & Chicago ran into preceding freight at Vienna Junction, O., damaging several cars.

2d, night, passenger train on Georgia Railroad ran over a misplaced switch into freight standing on siding in Messina, Ga., damaging several cars. Engineer and fireman were hurt.

3d, p. m., work train on Ohio & Mississippi ran into rear of a passenger train stopping at Flora, Ill., doing some damage and injuring a trainman.

5th, a. m., freight on Allegheny Valley broke in two near Parker, Pa., and rear section ran into forward one, damaging some cars and killing a brakeman.

6th, a. m., freight on Philadelphia & Reading ran into preceding freight at York Road, Pa., wrecking several cars. Engineer was badly hurt.

6th, a. m., passenger train on Fitchburg Railroad threw off 2 cars by a flying switch at Concord, Mass., but the freight man failed to stop the detached cars in time, and they ran into rear end of train, damaging a car and injuring 2 passengers slightly.

8th, a. m., freight on Pennsylvania Railroad ran into rear of a preceding freight near Irwin, Pa., wrecking 2 cars.

10th, night, passenger on Chicago & Iowa ran into rear of freight car, which had been blown from the siding on the main track by a heavy wind. The engine was badly damaged, and the engineer and fireman hurt.

12th, p. m., freight on Pennsylvania Railroad ran into another freight standing on the main track at Spring Mills, Pa., and the engine and 5 freight cars were piled up in a very bad wreck. The engineer, fireman and conductor were killed, and 2 other trainmen hurt. It is said that the standing freight train neglected to send out a signal.

13th, night, freight on Central of Georgia ran into preceding freight, which had stopped at McDonough, Ga., wrecking 4 cars.

16th, p. m., freight on New York Central & Hudson River ran into repair train standing on the track near Herkimer, N. Y., wrecking 2 cars and killing a brakeman. It is claimed that the repair train had no proper signal out.

20th, p. m., freight on Chicago, Burlington & Quincy ran into ballast train standing on the track near Ottawa, Ill., damaging several cars. It is claimed that the ballast train did not have signals out.

22d, night, freight on St. Louis, Iron Mountain & Southern ran into preceding freight near Carondelet, Mo., damaging several cars.

27th, a. m., freight on Wabash, St. Louis & Pacific ran into preceding freight, which had stopped for water at St. Charles, Mo., wrecking 8 cars.

27th, night, freight on Albany & Susquehanna backed over a misplaced switch into another freight standing on siding at Sidney, N. Y., wrecking an engine and caboose.

29th, a. m., freight on Pittsburgh, Fort Wayne & Chicago broke in two near Canton, O., and rear section ran into forward one, wrecking several cars.

29th, p. m., freight on New York, Chicago & St. Louis ran into preceding freight on a high trestle near Springfield, Pa., and two cars were thrown 70 ft. to the ground below and wrecked. A woman who was riding on the train was killed, another woman, 2 children and a brakeman badly hurt.

## BUTTING.

2d, a. m., butting collision between two freights on Philadelphia, Wilmington & Baltimore near Middletown, Del., wrecked both engines and 9 cars, killing the engineer and injuring 4 trainmen.

8th, a. m., butting collision between two passenger trains on Old Colony Railroad in South Boston, Mass., damaged both engines and several cars, and injured 4 trainmen and 12 passengers slightly. At the point where the collision occurred only one track was in use, owing to repairs in progress on a bridge. Freight trains were taken to have the signals set properly, but the engineer on the inbound passenger, it is said, deliberately disregarded the signal. He was an old engineer and well thought of on the road.

10th, very early, butting collision between two freights on Fall Brook Coal Co.'s road, near Lindley, N. Y., wrecked both engines and 6 cars. One of the trains had orders to take siding at Lindley, but failed to do so.

14th, evening, butting collision between two passenger trains on Louisville bridge track in Jeffersonville, Ind., wrecked both engines and injured a fireman fatally. The proper signals were displayed, but were disregarded by one of the trains.

16th, p. m., butting collision between a freight and a passenger train on Louisville, Evansville & St. Louis near Mt. Carmel, Ill., damaged both engines and several cars.

23d, a. m., butting collision between two passenger trains on Pittsburgh, Cincinnati & St. Louis near Burgettstown, Pa., wrecked both engines and injured 2 trainmen.

24th, noon, butting collision between freight and passenger trains on Wabash, St. Louis & Pacific near Woodstock, Mo., wrecked both engines and several cars, killing two trainmen and injuring 3 passengers.

## DERAILMENTS.

## BROKEN RAIL.

20th, p. m., engine of freight on Chicago, Burlington & Quincy was derailed in Quincy, Ill., by a broken rail.

20th, night, passenger train on Florida Railway & Navigation Co. road was derailed near Lake Weir, Fla., by broken rail. The engine upset, killing 1 trainman and injuring 2 others.

## BROKEN BRIDGE.

4th, p. m., wild engine on Missouri Pacific broke through a bridge near Harrisonville, Mo., and went down into the creek. The engine was wrecked and the fireman killed.

17th, night, freight on New York, Chicago & St. Louis broke through a trestle bridge near Abbots, O., and 6 cars went down and were wrecked.

30th, night, freight on Louisville, New Albany & Chicago broke through a bridge over the Wabash River near Delphi,

Ind., and 11 cars went down into the river. Two brakemen were fatally hurt.

## SPREADING OF RAILS.

7th, a. m., 6 cars of coal train on Buffalo, New York & Philadelphia were derailed near South Wells, N. Y., by spreading the rails.

7th, night, engine and 1 car of passenger train on Pittsburgh & Lake Erie was derailed near Youngstown, O., by spreading of the rails.

10th, night, engine and 10 cars of freight on Louisville & Nashville were derailed near Blount Springs, Ala., by spreading of the rails.

14th, night, engine and 2 cars of passenger train on Texas & St. Louis were derailed near Rector, Ark., by spreading of the rails.

15th, a. m., passenger train on Quincy, Missouri & Pacific was derailed near Novinger, Mo., by spreading of the rails.

19th, p. m., passenger train on Galveston, Sabine & St. Louis was derailed near Longview, Tex., by spreading of the rails, and 3 passengers were hurt.

28th, p. m., 3 cars of passenger train on Denver & Rio Grande were derailed near Cañon City, Col., by spreading of the rails, and 5 passengers were hurt.

28th, night, passenger train on Texas & Pacific was derailed near Sierra Blanco, Tex., by spreading of the rails, and 11 passengers were injured.

## BROKEN WHEEL.

12th, a. m., several cars of coal train on New York, Lake Erie & Western were derailed at Ridgewood, N. J., by a broken wheel.

## BROKEN AXLE.

20th, a. m., freight on Baltimore & Ohio was derailed near Bristol, O., by broken axle.

23d, a. m., passenger on Texas & Pacific was derailed near Ranger, Tex., by broken axle.

24th, a. m., 10 cars of freight on Central of Georgia were derailed near Cuthbert, Ga., by broken axle.

24th, night, 6 cars of freight on Gulf, Colorado & Santa Fe were derailed near Ft. Worth, Tex., by a broken axle.

28th, a. m., tender of passenger train on Albany & Susquehanna was derailed at Wells Bridge, N. Y., by broken axles. Two axles broke at the same time.

## BROKEN BRAKE-BEAM.

2d, midnight, 10 cars of freight on Boston & Maine were derailed at Plaistow, N. H., by a broken brake-beam which dropped down on the rails.

## ACCIDENTAL OBSTRUCTION.

4th, night, freight on Jeffersonville, Madison & Indianapolis ran upon a tree which had been blown down across the track near St. Louis Crossing, Ind., and the engine and several cars were thrown from the track and badly wrecked. A brakeman was killed and 2 other trainmen hurt.

## CATTLE.

11th, a. m., freight on Erie & Wyoming Valley ran over a horse near Kirby, Pa., and engine and 4 cars were derailed.

11th, p. m., construction train on Cincinnati, New Orleans & Texas Pacific ran over a cow near New River, Ky. The train was running backward, and 7 cars were thrown from the track and down a bank. Six laborers were killed, 5 others fatally injured, and 13 less severely hurt.

23d, evening, freight train on Union Pacific ran over a cow in Council Bluffs, Ia., and 8 cars were derailed.

24th, p. m., passenger train on Indianapolis & St. Louis ran over a horse near St. Mary, Ill., and the engine was derailed.

## WIND.

5th, a. m., construction train on Fremont, Elkhorn & Missouri Valley was blown from the track by a cyclone near Gordon, Neb.; 19 cars were wrecked and 12 persons hurt.

11th, night, passenger train on Chicago, Milwaukee & St. Paul was blown from the track near McCook, Dak., by a cyclone. The whole train was thrown from the track and upset, the cars being badly broken. Two trainmen and 7 passengers were badly hurt, besides a number slightly bruised.

## MISPLACED SWITCH.

4th, night, passenger train on Brunswick & Western was derailed in Waycross, Ga., by misplaced switch.

12th, very early, freight on New York Central & Hudson River was derailed near Gasport, N. Y., by misplaced switch.

17th, noon, passenger train on Western & Atlantic was derailed in Atlanta, Ga., by misplaced switch.

18th, night, engine of freight train on Albany & Susquehanna was derailed at Esperance, N. Y., by a misplaced switch and went down a bank, making a bad wreck. A brakeman was slightly hurt.

27th, a. m., passenger train on Missisquoi road was derailed in St. Albans, Vt., by misplaced switch.

## MALICIOUS.

7th, night, engine of freight on Louisville, New Albany & Chicago was derailed near North Stinesville, Ind., by a tie fastened across the rails. Two boys were arrested for placing the obstruction and sent to jail.

26th, night, passenger train on Detroit, Lansing & Northern was derailed near Ionia, Mich., by misplaced switch. The engine upset into the ditch, injuring engineer badly. The switch had been locked open and the signal light removed by persons unknown.

## UNEXPLAINED.

1st, a. m., engine of passenger train on Lehigh Valley ran off the track near Mauch Chunk, Pa., and was thrown directly across the track, with the baggage car on top of it. One trainman was hurt.

2d, p. m., 3 cars of freight on New York Central & Hudson River were derailed on the high bridge over the canal at Lockport, N. Y., and were thrown across the bridge in a manner which made it an extremely difficult matter to clear the track.

5th, a. m., freight on New York Central & Hudson River was derailed in Charlotte, N. Y.

7th, a. m., engine and 2 cars of passenger train on Louisville, New Orleans & Texas were derailed at Ross, La., killing the fireman and engineer and injuring 6 passengers.

13th, a. m., passenger train on Chicago, Burlington & Quincy was derailed near Ackworth, Ia., wrecking 2 cars and injuring 3 passengers.

14th, a. m., freight on New York Central & Hudson River was derailed near Stuyvesant, N. Y.

16th, night, freight on Galveston, Harrisburg & San Antonio was derailed near Sanderson, Tex., wrecking 18 cars and killing a brakeman.

29th, a. m., freight on Texas & Pacific was derailed near Colorado, Tex., wrecking several cars.

30th, a. m., circus train on Chicago, Milwaukee & St. Paul was derailed near Owatonna, Minn., and three cars went down a bank and were wrecked, killing a kangaroo.

30th, night, freight on Old Colony was derailed near Crane's, Mass., blocking the road several hours.

## OTHER ACCIDENTS.

## BOILER EXPLOSION.

12th, very early, engine on passenger train on International & Great Northern exploded its boiler while standing at the

depot in Palestine, Tex. The force of the explosion was upward, pieces of the boiler being thrown to a great height and falling 300 yards away. The fireman was slightly hurt.

## MISCELLANEOUS.

1st, a. m., axle broke under a freight car on Houston & Texas Central, near Waco, Tex. The car did not leave the track, but the train was delayed some time.

18th, p. m., engine of special passenger train on Albany & Susquehanna broke an eccentric strap when near Maryland, N. Y., delaying the train an hour.

23d, night, car of freight on Texas & New Orleans caught fire when near Houston, Tex., and was damaged. A brakeman was slightly hurt in trying to put out the fire.

## SUMMARY.

This is a total of 75 accidents, in which 24 persons were killed and 115 hurt; an increase, as compared with June, 1884, of 4 accidents, a decrease of 16 killed, and an increase of 12 injured. A statement of the totals and averages will be found elsewhere.

The half of the current year to the end of June shows a total of 665 accidents, 131 killed and 800 hurt; an average per month of 111 accidents, 22 killed and 133 injured.

## The St. John Bridge.

The St. John (N. B.) *Telegraph* of July 21 gives the following account of the completion of the great bridge over the St. John River at that point:

After many years of discussion, and nearly three of actual work, the new cantilever railroad bridge across the falls is completed. Yesterday afternoon a locomotive and train crossed over the bridge for the first time, carrying quite a number of passengers, among them many prominent railway men of the United States and Canada, and quite a number of citizens. The completion of the bridge marks a very important era in the railroad history of the province and really completes what was the dream of the projectors of the first railway in New Brunswick, to which they gave the somewhat high-sounding name of the European & North American Railroad. As yet Canada has no transcontinental railroad of her own, but early next year the Canadian Pacific will be completed. When the bridge is opened, however, trains leaving Halifax will make close connections with those on the different United States railways, and run through to San Francisco. By going over the Intercolonial this may now be done, but there is quite a saving of time by using the shorter routes through the United States. When what is known as the Short Line Railway is completed, connecting St. John with Montreal, and the last spike is driven into the Canadian Pacific, Canada then will have practically through her own territory the shortest transcontinental railroad. Perhaps then the dreams of the projectors of the European & North American Railway will be in part realized, and St. John become a shipping port of Asiatic goods marked Liverpool and Paris, brought over the Pacific Ocean in steam packets, and then carried across the continent by the Canadian Pacific.

But these dreams of the past had better be left undisturbed for the present, as any benefits likely to arise from the through trade of Canada's transcontinental line are still a long way in the future. That the bridge will be of great assistance in further developing the railway interests of both sections of the province, and the trade of the eastern section, is not disputed. What the effect on the trade of St. John will be remains to be seen, but the majority of those most interested are of the opinion that what benefits any section of the province must benefit St. John.

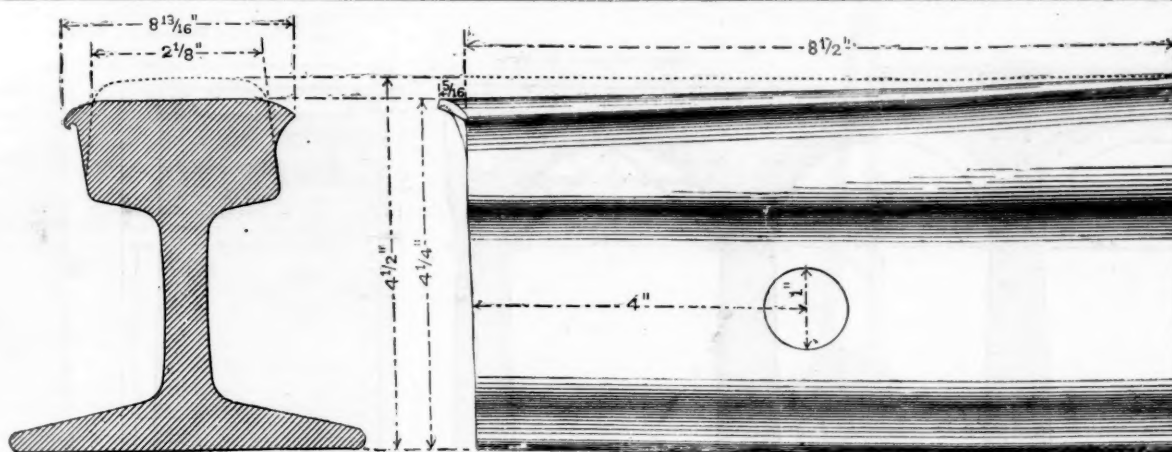
The railway bridge over the falls is beyond all doubt the greatest enterprise of the kind yet attempted in this province. When the late W. K. Reynolds conceived the idea of throwing a suspension bridge across the river between Split Rock and the opposite shore, many thought him visionary, and argued the bridging of the river an impossibility. Some of them knew of the failure of the first attempt, between the Straight Shore and Carleton, in 1837, and also of the attempt of a Yankee named Reynolds to construct a deal bridge across the river, which also proved a failure. Mr. Reynolds, however, was not the man to be easily discouraged, and, rather than fail, he made a house-to-house canvass of the citizens, and finally secured enough capital, with his own, to complete the structure. The Suspension bridge was finished in 1852, and, as remodeled 6 years later by Mr. Tomlinson, the oldest and best known bridge-builder on the continent, is still standing, and likely to endure many years yet. In 30 years great changes have come over the world. Bridge-building has now become so common that it is only the most important works that attract more than passing attention. The railway bridge across the falls may fairly be considered one of the great bridges of the continent. The river is not so wide as the St. Lawrence at Montreal, which is spanned by the great Victoria Bridge. This, however, instead of being a single bridge is really a number of bridges supported at regular intervals by massive stone piers. The greatest length of any of the spans of that bridge is 340 ft., so that the span across the St. John is much longer, the distance between the piers being 477 ft. The longest truss span in America is at Cincinnati, over the Ohio River, the distance being 515 ft. Next to this comes the St. John Bridge, and then the new cantilever bridge over the Niagara River, the span of which is 369 ft. St. John, therefore, has reason to be proud of its new railroad bridge, which will certainly add greatly to the attractiveness of the falls for visitors. At the present time hundreds of people, young and old, visit the bridge to inspect it. Hundreds, also, have walked over it since the connection was made on Friday, July 10. The bridge is certainly the lion of the hour, and will add another to the many sights of St. John.

Before the present plan of the bridge was adopted, two schemes were considered and abandoned in favor of the cantilever principle. This principle Mr. P. S. Archibald, Chief Engineer of the bridge and railway extension, says is not a new principle, but has long been known to engineers. For some reason, however, it has not been generally adopted, although it is undoubtedly best suited for such gorges as that which the St. John passes before it enters the Bay of Fundy. The first practical adoption of the principle was in erecting the long truss bridge over the Kentucky River. Some years previous a company had undertaken the erection of a suspension bridge at the point where the truss bridge was to be constructed. After the towers were completed the project had fallen through, but the towers were left standing. It occurred to the engineer, Mr. Shaler Smith, that they might be utilized in constructing the new bridge, and they were used during the erection of the bridge to support the truss. Therefore, while the erection of the bridge was proceeding, it was on the cantilever principle. When completed, however, the principle was not incorporated in the bridge, it being of heavy truss-work. Since then, cantilever bridges, similar to that at St. John, have been erected over Niagara River and also over the Fraser River in British Columbia; the span of the last mentioned is only 375 ft. in length. The St. John bridge differs from these two in being a through









(Half full size.)  
A SPECIMEN POOR STEEL RAIL.

Will you permit me to say, with reference to the terms of the lease of the Central Pacific to the Southern Pacific, as "to the rental of \$1,200,000 being absurdly inadequate," that I have based my remarks on what the directors and their agents have stated in their report dated June 1, 1883, and what Mr. Huntington wrote to me.

At page 11 of the report signed by Mr. C. Crocker, he says: "The benefit to be derived from an increased settlement along the Central Pacific main line and branches will be much more than an equivalent for the loss of any through traffic that may go by other routes." At page 36, being the conclusion of Mr. A. N. Towne's report, he says: "The last six years, from 1876 to 1882, the tonnage handled between stations within the state of California, shows the remarkable increase of nearly 130 per cent., resulting, not from an increase of mileage, but from the general growth and development of the various industries tributary to the roads, made possible by their construction. This improvement has prevailed in varying degrees annually, and we may confidently expect it to continue for years to come." At page 64, which concludes Mr. W. H. Mills' report, he says: "All the aspects presented fully justify the common opinion that the entire Pacific coast region is in the dawn of an unexampled era of growth and prosperity, and that in the early future it will comprise a vast empire of population and wealth." In a letter from Mr. C. P. Huntington, dated May 23, 1884, he says: "The earnings for April are again up to the standard of previous years, and the business prospects were never better in its past history." In the same letter he says: "Their only sales of stock (alluding to the directors) were made when the prices ranged at about double their present figures; they see no reason why other stockholders should sacrifice their property for one-half of its true value." I conclude with an extract of a letter from Mr. Huntington, dated June 24, 1884. He says: "With the exception of the interruption and damage by freshets during the spring months, the business and prospects of the company are good," etc., etc. I think, sir, I have written enough to show that either the quotations I have made are not a true statement of facts, or that the payment of \$1,200,000 a year for such a property is "absurdly inadequate."

I hope the day is fast approaching when it can no longer be said that "American shareholders seem to feel that they have no rights which their directors are bound to respect."

W. L. MARTIN.

#### Poor Steel Rails.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I send you herewith sketch of a crushed rail end. I had many rails last winter crushed worse than the one from which this sketch is taken, but give this as showing fairly well the manner in which the metal flows or rolls over at the sides and ends.

The Michigan Central laid in 1881 English rails exclusively; in 1882, 1883 and 1884 American rails, from a different mill each year. The crushed ends occur in the English rails to a slight extent, more frequently in the American rails of 1882, still more frequently in those of 1883, and the 1884 rails are the worst of the lot. How serious a matter this is may be gathered from the statement that of 536 rails laid in one piece of track in July, 1884, 220 rails had been removed by the following February (six months), and 50 per cent. of the lot were taken out, on account of crushed ends, before the expiration of the first year. In one stretch of 17 miles of the 1883 rails, 90 per cent. will not run through the next winter if it is as severe as the last and the road-bed rigid for so long a time.

The first symptom of softness is the flowing of the metal at the end in the direction of the length. Then follows the spreading at the sides and the change in shape of the entire head of the rail. The whole length of the rail is usually somewhat affected, but the ends become seriously affected before the balance of the rail has had time to show much change in shape. If there happens to be a split in the newer rails, they give out much sooner than the older rails. Many roads will notice the first symptoms of softness in rails by watching the frogs, and seeing how much quicker they wear out than formerly.

Straight line, as well as curves, shows the crushed ends, and gravel ballast on clay bottom and on sand bottom and loco-

motive cinder ballast all show about alike. The joint is laid on a tie, and 24-inch angle splices are used. The double track is laid with the same joint, but does not show nearly as bad results as the single track. That any peculiarity of track or traffic is responsible for the trouble need not be considered a moment, except to say that under the same conditions the older American and English rails are standing up well. Much is being written concerning the weak points of the present angle splice. It seems not to have occurred to the writers on this subject that the angle splice could not change a poor rail into a good one. Whatever the defects of the angle splice, it is still far superior to the old straight splice, and the older steel rails stood up well with the short straight splice and with a chair under the end of rail. The splice probably performed no office after the first few months, except to keep the rails in line; but still the rails did not wear much faster on the ends than in the middle, and could be worn out in track with once cutting off the ends, and on many roads even this was not done.

To show that my experience is not singular in this matter of poor rails, I quote an extract from a letter received from the General Superintendent of one of the largest steel rail mills in the country:

"Since I last wrote you I have had a trip over the road. Same old story of crushed ends, the worst rails being some 15,000 tons of the 'A' Company's make. 'B' Company's also bad, and our own make not reflecting any credit on us. 'C' Company's and 'D' Company's all showing same defects. The result of this trip has convinced me that something was radically wrong in the methods of manufacture. I am certain that all of our rails subject to heavy traffic will show 25 per cent. crushed ends, while balance of them will do good service. All other works will show up in nearly the same ratio."

I think the conclusion as to percentage given in this letter is wrong, as, out of 200 rails sent me from this mill in January to replace rails returned for crushing at ends, nearly every rail shows signs of crushing.

These soft rails are as liable to break in track as harder rails. The analysis runs about as follows:

Carbon . . . . .	0.29 to 0.48	Manganese . . . . .	0.80 to 1.10
Sulphur . . . . .	0.01 to 0.10	Phosphorus . . . . .	0.06 to 0.15
Silicon . . . . .	0.03 to 0.05		

The fracture is very coarse. The rails stand the old-fashioned mechanical tests well, showing that some new test is needed which will develop this new weakness before rails leave the mills.

Representatives of the mills making poor English and American rails have all admitted that the rails were too soft; but, so far, profess to be unable to state the cause of failure, and in the case of the three American mills directly interested in our poor rails, give no satisfactory assurance that their present product will show any better results. There must be some cause for the trouble. It may be in material used, but it is more likely to be in the process of making or rolling the steel.

I understand the Chicago, Burlington & Quincy Railroad and the Pan-Handle are having rails crushed at the ends, and in a recent trip over the West Shore I saw the first stages of the trouble in the rails of that road.

When traffic is light the rails will stand up well enough to fulfill a five years' guarantee, but will at the end of that time be of far less value to a railroad than if properly made.

While we have not the element of danger in this new trouble, the cost of frequently taking out and putting in new rails will make nearly as much expense as attended the frequent changes of rails in the age of "brittle" steel. The remedy for this state of affairs must come from the railroads. The maintenance of way men who are having trouble from crushed ends can hasten matters materially, especially if any of them have discovered a test by which we may be able to discover when a rail is chemically hard and mechanically soft.

I assume that the mills mean to make good rails. They must be guided solely by the experience of the railroads using the rails. It takes months or years to develop defects in rails such as I have mentioned, and as nearly all the mills seem to be turning out rails that will not stand heavy traffic, I have felt that it is only proper that I should mention the facts that have come under my own observation, and hope others will be equally frank in the interests of the mills and equally of the railroads.

J. D. HAWKS,

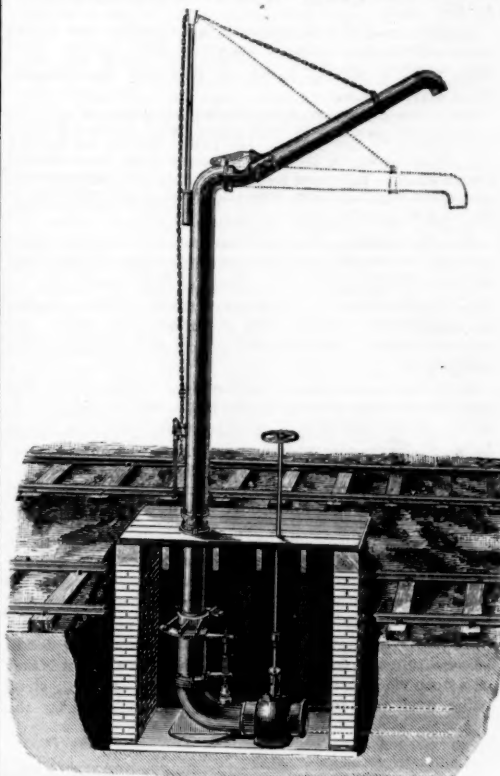
Chief Engineer Michigan Central Railroad Co.

[We have discussed the questions raised by Mr.

Hawks in this letter in another column.—EDITOR RAILROAD GAZETTE.]

#### The Dodge Railroad Stand-Pipe.

Among the appliances for railroad use which have been greatly improved within the past few years, are the devices for delivering water to the locomotive. Formerly, a simple drop-pipe from the water tank was all that was deemed necessary, but with the increase of traffic, the constant additions of double track and the growing necessity for water supply at each end of yards so as to obviate the annoyance of trains going one way having to make an extra stop for water, something better became desirable, and the crane or stand-pipe has been largely introduced; water being conveyed in suitable piping from a single tank at any convenient point in the yard to as many places as desired on the station grounds. Some of the older styles of cranes, even among those still in use on

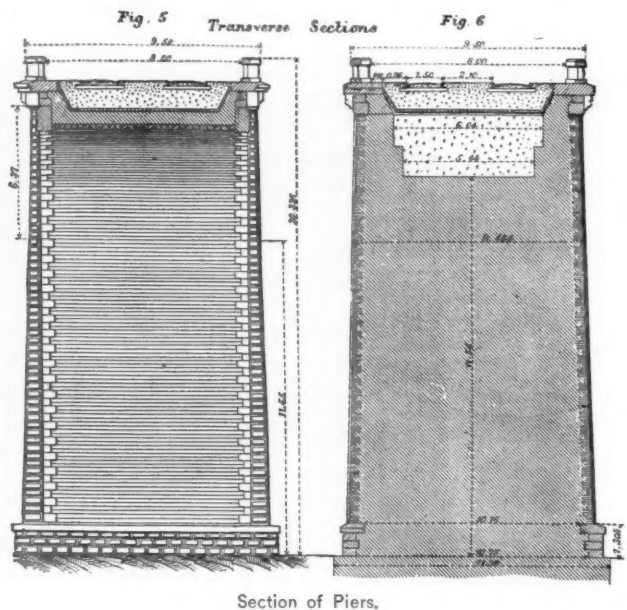
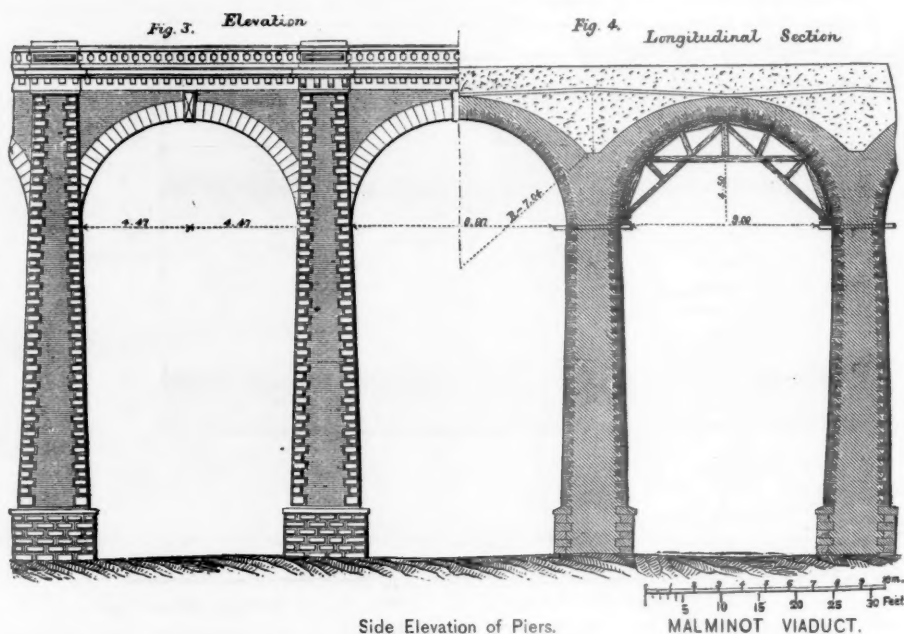


The Dodge Railroad Stand Pipe.

many of the older roads, were objectionable in many details, especially in respect to freezing up and leaking at joints, but the merit of this system of supply has continually extended its use, with the usual result of many successful and unsuccessful efforts at improvement.

One of the latest of these improved forms is the Dodge stand-pipe, manufactured by the Sheffield Velocipede Car Co., of Three Rivers, Mich., which manufactures a variety of other specialties for railroad use, as their name implies. The pipe, as will be seen, possesses many points of excellence, and we are informed has met with much favor, being already largely used by a number of important roads, some of which have adopted it exclusively.

The Dodge is both a rotating and elevating pipe, and its mode of operation is as follows: It is turned from the platform by means of a jointed lever hanging (when out of use) at the side, the drop is lowered to any desired height of tender, and the water is turned on by a hand wheel. When the tender is filled, the water is shut off and the spout elevated, when the rotation of the pipe to place automatically releases the waste valve in a manner clearly shown at the bottom of the engraving and readily comprehensible without description. By this means all water not taken is conveyed below the frost and disposed off through a main in the bottom of the pit,



thus avoiding all drip upon track, which is a constant source of annoyance in winter.

The elevation and depression of spout is made possible, while still preserving a tight joint, by means of a flexible rubber joint, which is claimed to be a most valuable feature.

The entire weight of the drop-pipe is carried upon ears or lugs, so arranged as to admit of lateral as well as perpendicular movement, and the rubber is claimed to be so treated as to be affected neither by the action of water nor by any degree of cold. In proof of this we are told that they are now in place on pipes where they have been in constant use for five years.

Another feature of these pipes is that there are no packed joints used in them, with the single exception of the valve stem, which is entirely below the frost line and therefore never gives trouble.

The valve is of gun-metal and is furnished either of globe or straight-way form. It is so arranged as to be quick opening—three turns of the hand-wheel opening it to its full capacity. The valve can be entirely taken out in case of obstruction by the removal of the few bolts shown on the extension, constituting another advantageous feature.

The pipe occupies but a very small space; it can, if necessary, be placed and operated in an area of 2 square feet. The manufacturers claim that it will deliver more water, size for size, than any other made, because there is no inside mechanism whatever to interfere with a perfectly free flow; and that as there are very few parts to it, it is less liable to derangement.

This stand-pipe is made of either 6-in. or 7-in. diameter, and can be attached direct to city mains where required. It is fully guaranteed under a pressure of 100 lbs. to the square inch. Its leading features can be so clearly seen in the engraving as to render unnecessary further description.

#### The Malmot Viaduct.

The structure illustrated has been recently built over the valley of the Pax River, on the Montauban & Cahors line of railroad, in France. We reproduce it from the *Annales Industrielles*, not only as an interesting structure in itself, but as a pleasing example of effective architectural treatment with a minimum of costly cut stone-work; for it will be seen from the plans that although the general effect is that of a stone viaduct, nearly all of the masonry is brick, stone being used only for the corners and facings and for the

edged stone. Above that, brickwork, the bricks being made on the site. The angle facings are rough dressed. Each of the centres was supported on a single rail fixed in the masonry, and 15 days were allowed between the keying of the arches and the striking of the centres. The maximum compressive stress at the keystone is 71 lbs. per square inch. The superficial elevation area over all is 28,083 square feet, the unfilled area being 1,445 ft., leaving actual area 13,638 ft., or a ratio of space to actual masonry surface of 1 to 0.94. The area in plan is 17,373 square feet. The cost was as follows:

Foundations, 5,023 cubic yards.....	\$18,700.00
Superstructure 12,844 cubic yards.....	64,000.00
Centring.....	5,300.00
Accessory expenses.....	2,500.00
Total for superstructure.....	76,300.00
Total with foundations.....	95,000.00
Cost per lineal foot, including foundations.....	1.53
Co- of foundation masonry, per cubic yard.....	3.72
Cost of superstructure, per cubic yard.....	5.04

#### International Railroad Congress at Brussels.

In connection with the International Exposition at Antwerp this summer, our international railroad congress has been invited to meet at Brussels in the week beginning Aug. 8. The President of the Committee in Charge is M. Fassiaux, General Secretary of the Department of Railroads, Posts and Telegraphs of Belgium. Invitations have been extended (and accepted) to delegates from America, France, Hungary, Russia, Prussia, Bavaria, Baden, Holland, Roumania, Denmark, Sweden and Norway. Only regularly accredited delegates will be allowed to take part in the proceedings. These will be in French; but any one not speaking French will be allowed the services of an interpreter.

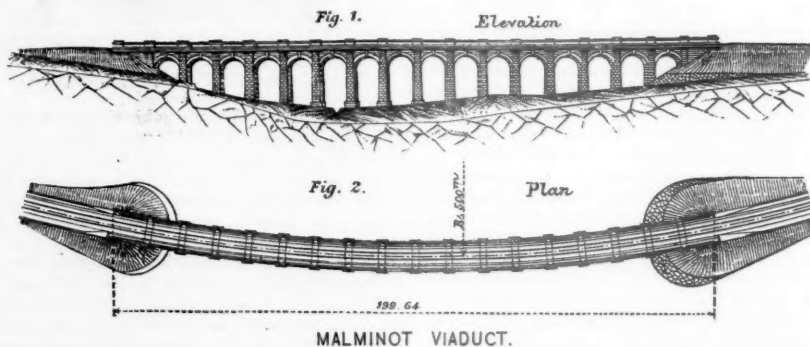
The programme is as follows:

##### Section 1. Train Service and Equipment.

- I. Discussion of the following questions:
  - Arrangements for speed, safety, and comfort of passenger traffic.
  - Means of signaling to and from points between stations.
  - Block signal systems.
  - Safety at stations.
  - Drawbridge signals.
  - Influence of the block system upon the capacity of a road for traffic.
  - Influence of interlocking switches upon the capacity of stations.

##### II. Principles to be observed in building

- (1) Stations for moderate traffic;
- (2) Main passenger stations;
- (3) Yards for freight cars;



foundations. It may therefore afford a useful hint to those having masonry works of this general type to design.

The viaduct consists of 15 arches of nearly 30 ft. span each, the whole length being 618 ft. It is built on a curve of 1,640 ft. radius, and on a gradient of 1 in 100. The height at the middle is 63 ft. The foundations presented no difficulty, but some of the piers had to be carried to a depth of about 30 ft., the excavations requiring care and timbering. The building of the foundations occupied four months, and the superstructure 16 months.

The piers up to the top of the base are in rough, dressed-

- (4) Terminal freight stations;
- (5) Union stations for roads of different gauge.

##### III. Organization of service on lines operated by two or more roads in common.

Division of expenses of construction and management.

Organization of the service for interchange of traffic between different stations in the same town.

##### Section 2. Train Service and Equipment.

- IV. Means to facilitate interchange of traffic of connecting roads.
- V. Means of diminishing expenses:
  - (a) for maintenance of way, and track watchmen;
  - (b) for train service and maintenance of rolling stock;
  - (c) for station service.

##### VI. General arrangements for safety:

- (a) Continuous brakes.
- Running on long inclines.
- (b) Safety of passengers—car construction.
- (c) Safety of employees.

##### VII. Applications of electricity to railroad service.

##### Section 3. Construction and Maintenance of Way.

- VIII. Discussion of different systems of construction, and the different conditions under which they are available.
- IX. Discussion of the methods of comparing the probable economy of different projects for the same line.

##### Section 4. General Questions.

##### X. The future of local railroads.

- Means of arranging the connections between narrow-gauge and broad-gauge roads.
- Economical systems of management for lines with light traffic.

XI. Most available means for giving railroad officials the chance to use Sunday as a day of rest.

XII. Determination of statistical units and of common forms for making railroad returns.

#### English and American Baggage Systems.

The American's earliest experiences in England with his baggage provoke him. He wants to "check" it, and he cannot do it. At home, if he is going from New York to Boston, for instance, he buys a ticket at one of the numerous ticket offices which are scattered over the city, states what train he is going on, and is informed of the hour at which the baggage-wagon will call for his effects. When it does call, the messenger in charge of it gives him a little brass plate on which is a number, and the words "New York" and "Boston," and attaches to his trunk, by means of a little leather strap, a duplicate of it. If the traveler drives directly to the depot, he buys his ticket, presents his baggage at the baggage counter, and receives his brass check for it, the exhibition of his ticket being a warrant for the transfer of the trunks or parcels he has to the point to which he is going. If he is leaving a hotel, the porter who carries his trunks from his rooms will hand him the checks before he leaves the house. In any case he has no further concern with his traps until the end of his journey. Half an hour before he reaches Boston, an express agent—"parcels delivery clerk" they would call him in England—comes through the train, and, if the traveler wishes, takes the address at which he desires to have his things delivered, and taking his checks, gives him a receipt on a small printed form. Within an hour or so everything is at the hotel or residence. If the traveler's personal comfort requires that his effects should accompany him at once from the train, he gives his checks, when he alights in the station, to his hackman, or to the bagged and labeled employé of the hotel he means to visit.

All of this is, of course, thoroughly familiar to Americans; but English people know nothing of it, and have almost nothing in their system of travel that resembles it. To Americans the baggage check is one of the greatest comforts of travel, and when they go abroad they miss it painfully.

At Liverpool, after you have had everything formally overhauled in the custom-house room on the landing in search of liquors, tobacco or dynamite, or foreign-printed editions of British authors, and you find yourself free to go on land with your baggage—which has now become your "luggage"—a sense of exasperating helplessness overpowers you. A polite official (polite, but not as full of responsibility as one would like to have him appear under the circumstances) asks you if you desire to have your luggage sent to the London & North-western. "No; want it checked to London." "Checked, sir? Beg pardon, sir; but you've got to take it to the station, sir. Shall I send it sir? Check? Receipt? W'y, it's hall right, sir. It'll be up in no time!"

Full of misgivings and the distrust which afflicts strangers, unable to get your comforting bit of stamped brass or the assurance implied in a receipt, you go off to the North-western, hotel and terminus combined, have breakfast or luncheon, and find that your luggage does arrive—out of sheer force of integrity you feel it to be—and that you have to pay probably five shillings for it—about twice as much as you ought to pay by rights, and about one-half what you would have to pay for a like service in an American city. One would think that this would prove reassuring; but it does not. On the contrary, it marks the stage in your experience where you find that the entire care and responsibility for the transportation of your properties rest upon yourself. A porter approaches: "For London, sir? First-class, sir? Yes, sir?" You go with the porter, who bundles the things on a truck, and deposits them in the luggage van or in the luggage compartment of the carriage in which you secure seats or a compartment for London. A shilling compensates the porter, whose extreme deference affects different people in different ways, accordingly as it impresses them as the agreeable politeness and thoughtfulness of an English servant, or as the vile servility of the British menial, or arouses the suspicion that



their "tip" has been unnecessarily heavy. Americans abroad differ greatly in opinion about these matters of detail.

"Clearly," the American thinks, "these people don't know how to travel. The idea of having to look after one's baggage all the while! It is ridiculous."

Four and a half hours later, at Euston square, the immense terminus of the London & Northwestern Railway in London, he has to identify his effects on the platform, where they are deposited immediately the train stops. Each traveler picks out his own. If he is not promptly there to do it, there is nothing to prevent any one who chooses to do so from claiming it and taking it off. This negative abuse is at such enmity with his notions of public comfort and protection that it fills him with indignation and with a supreme contempt for the primitive system of English travel.

"Why do they not adopt our American method? Where is Hoole, the baggage-check man of Chicago? Why does not that apostle of public welfare come here and introduce the system? Look at the ambition of these people to be luxurious, the craving of them after every appliance and apparatus of comfort! And yet they have no baggage-checks."

Probably there is nothing that so much impresses the American on the English railroads as the apparently defective baggage system. For all that, there is another side to the question, and a brief experience of English life and habits serves to show that the baggage-check system, if established in England, would be established for the benefit of traveling Americans alone.

The English people do not want it. The Englishman is wedded to his luggage and his cab. When he arrives at his station he waits invariably to take his luggage along with him to his house or his hotel. He will not be divorced from it for a moment. No brass check will ever be a legal tender for a trunk in his eyes. The assurance that it is in the same train with him, that where he goes it goes, that when he arrives it arrives, and that it is there on the top of his cab, or in the cab with him, is to him the essential thing in all his journeying. He has no "express" such as we know in America. Express companies are not a possible adjunct of railway corporations in England. He has his cab, his "four-wheeler," built especially to carry his heavy luggage on top of it—a vehicle that the American hackman would look down on with lordly contempt, but a powerful engine of economy, industry and public convenience. His luggage would go through the roof of a New York hack, crush it like a paper handbox, but on the roof of an English cab his traps, including his bath-tub, are railed in and secured, and are in his apartments as soon as he is there himself.

"But," you say to the English railway manager, "you have been in America, and you have studied the system there, and you cannot but be favorably impressed with it?"

"Undoubtedly I was," he replies. "I was struck with its completeness and the extent of its organization and details. Your style of vehicle enables you to carry out such a system with perfect ease. It forms a kind of natural offshoot of the railway system in America; but it appears to flourish only in your country. It is not and would not be appreciated here. You complain that at the English terminus any one can claim your luggage and disappear with it. No doubt, if you are slow and they are sharp, such may be the case, and the company may have to pay the penalty; but the English traveler prefers the freedom of the present practice, and would, I fancy, wish the check system at a warmer place than the United States when any delay arose in dealing with his luggage at the stations owing to the adoption of the check system. The English traveler's idea of luggage 'checking' is to have his portmanteau safely stowed under his carriage seat, and his smaller articles placed in the rack over his head. I do not see any insuperable difficulty in adopting the check system in this country, but none of the partial attempts that have been made in that direction have proved successful or popular."

Americans who spend a vacation in Europe not uncommonly form the opinion that the compartment carriages must eventually give place to cars of the American pattern. A merely casual survey, such as the travel of the tourist affords, of the manners and habits of even a people as nearly allied to Americans as the English, does not convey any adequate idea of the degree in which the distinctions of class govern matters of the kind. A railway carriage is a modification of the private carriage, the post-chaise, the stage-coach and the carrier's wagon. Those vehicles have been merely adapted to steam traction and railway schedules, and the conventions which characterized their use before Stephenson's time remain unchanged in their new condition.—*Harper's Magazine for August.*

#### Pittsburgh Local Passenger Traffic.

For some time past the conductors on the Pennsylvania Railroad have been counting heads on their trains—or rather tickets which represent heads—for the purpose of finding the daily local traffic between Pittsburgh and Walls station, the terminus of the accommodation trains. They passed through the cars accompanied by a marker, who took down a record of every ticket—commutation, school, 50-trip and regular. After a week's work of this kind, each conductor was able to report the average daily travel of his train, which was taken as the daily average of the year. The reports were all handed in to Mr. Henry Carpenter, the Ticket Receiver for the Western Division of the main line of the road, and he has finished his report to the general office of the company at Philadelphia. The report shows some interesting matter of local interest, in that it gives the exact number of people who, living in the suburbs, do business in the city. The annual travel of this class of passengers foots up an exceedingly large total, and, while not taking into account any of the through travel, or passengers to points out beyond Walls, shows a very large business in the way of suburban travel into the city over the Pennsylvania road.

Footing up the conductor's reports, Mr. Carpenter finds that every day in the year, excepting Sundays, 10,910 people come into the city from between here and Walls. Of this number 3,670 travel on commutation tickets and 7,240 on all other kinds of tickets and cash fares. On the Sunday trains 480 persons come in on commutation tickets each Sunday, and 2,800 on 50-trip and regular tickets. So that in one year, counting 312 week days and 52 Sundays, there are carried on accommodation trains 3,503,920 passengers on week days, and 170,360 on Sundays, making a total local travel of 3,674,480 persons.

The larger part of the daily travel is from East Liberty; Shadyside, Homewood, and Wilkinsburg come next as furnishing the most passengers. The trains very rapidly fill up from the stations between Wilkinsburg and the city. There is quite a large travel also from points beyond Walls, which does not enter into the report. From stations out as far as Greensburg there are daily passengers, and on the through trains the travel is mostly heavy. Taking a probable estimate there are not less than an average of 14,000 people who enter the Union Depot every day over the main line of the Pennsylvania road.

"I would estimate that there is a local travel into the city each day of the week, excepting Sundays, over the different roads that centre at the depot, of not less than 18,000 people." This was Gatekeeper Lenhart's estimate. He has been

several years at the depot, and he has a very good idea of the travel each day through the gates. Taking this estimate as the one most likely to be correct without statistics from the other roads, a grand total of about 6,000,000 people, local passengers, pass through the two little gates at the Union Depot every year, in and out to the suburban towns.

This much for the Union Depot and its business, and if statistics were published giving the number of local passengers in and out of the other railroad depots of the two cities, most people would be surprised at the large total of people who, doing business each day in the city, live without its limits. The local trains on the Fort Wayne, the West Penn, the Pittsburgh & Lake Erie, the Baltimore & Ohio, and the Pittsburgh & Western routes are crowded mornings and evenings with local passengers. "It is safe to say," said a railroad official this morning, "that there is a local travel in and out of the city each day of 40,000 passengers." This large total of passengers will show up surprisingly to most people who have not given thought to the matter, but it has been figured out closely and it is well established. That the city's population is increased each day over one-fourth, from sunrise to sunset, with out-of-town people, is a matter of fact, and shows also what no city of the second class in this country does so largely—a disposition in the people to live in the country as much of their time as they can.—*Pittsburgh Chronicle-Telegraph.*

#### Boiler-Drilling Machines.

The engraving shows a simple self-acting portable drilling machine, designed for drilling the inside of locomotive and other boiler-shells. The machine is suspended by its driving cord, and each tool thrusts away from the other. There is a self-acting feed, and either or both tools may be thrown out of work by slacking a nut without stopping the machine.

The machine has been brought out by the English firm of Sharp, Stewart & Co., Limited. For the engraving of it we are indebted to *Engineering*.

#### The Electric Railroad in Baltimore.

The new Hampden Branch of the Baltimore Union street railroad, which is to be operated by electricity, is described by a correspondent of the *Electrical World* as follows:

To equip this road the joints of the outer rails were perfected, and a third rail, an ordinary 25-pound T-rail, similar to the outer rails, laid, with the Daft patent insulator, midway between the outer rails. The insulator consists of an iron shoe of diamond shape, 8 in. long, 3½ in. wide and ¼ in. thick, with two converging ways upon one of its surfaces. Wedged between these ways is a round block of wood of truncated-cone shape, with height 2½ in. Upon this block is screwed a round iron cap. This is 4½ in. in diameter and 2 in. deep. Coming within ¼ in. of the iron shoe, it thoroughly protects the wood block. The rail placed on the cap is held in position by two bolts screwed into the cap. The difficulties of constructing such a work, it being all entirely new, have been many, but have been met and successfully overcome. The centre rail forms the outgoing lead, the two outer rails, with the ground, being the return. The resistance of such a line will be less than 3 ohm, with perfect joints. At the main terminus a new building, forming one room 20 by 40 ft., has been built for the engine and dynamo. The engine is a 16 by 24 in. "Atlas" engine, built at Indianapolis. The boiler and all fittings are from the same firm. The dynamo is one of the Daft Co.'s largest. Its total weight is 4,200 pounds, and its maximum capacity is 300 amperes at 125 volts electromotive force. A 9-in. double belt connects direct from the 10-ft. fly-wheel on the engine to a 15-in. pulley on the dynamo. Switches, regulators, automatic cut-outs and all other safety devices necessary for a complete system will be put in as precautionary measures against every possible form of danger or trouble.

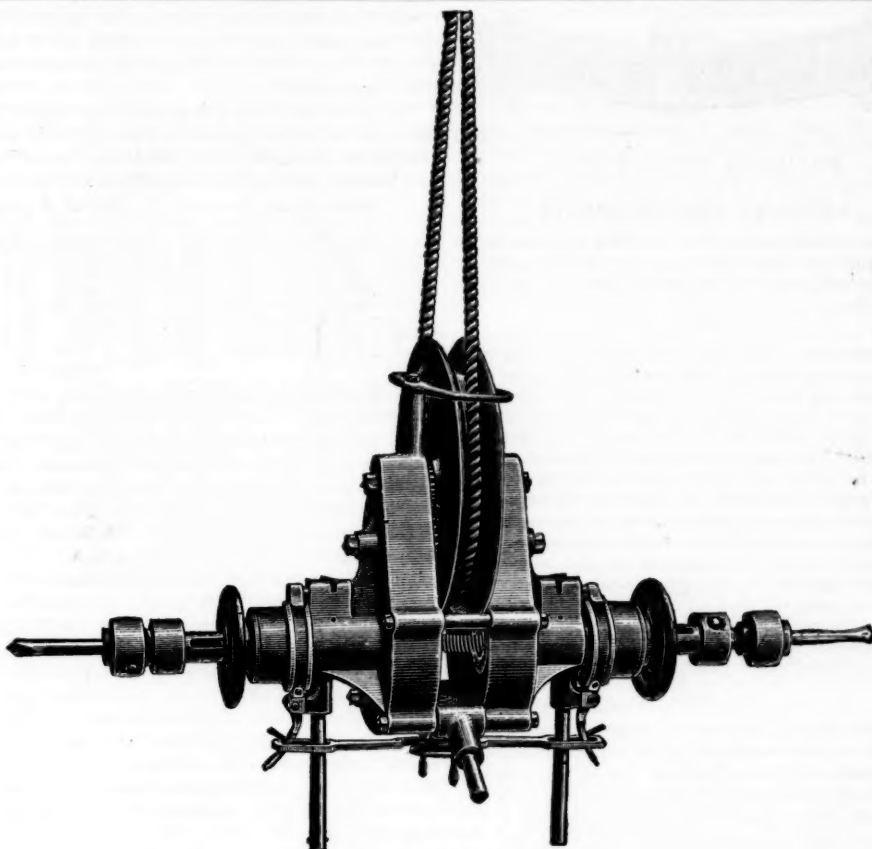
The receiving machine is a compound series motor capable of delivering 8 horse-power. Its total weight is 1,100 pounds, the armature being 196 pounds. The compound nature of the field permits of a wide range of resistances, and hence of magnetic strength of field. As the armature speed depends in a certain sense upon this field, a perfect means of

regulation of speed is obtainable. Motion from armature shaft to car-wheels is obtained by internal gears. Upon each end of this shaft a 3-in. phosphor-bronze gear is keyed. These engage with large gears 27 inches in diameter, fastened to the axle of the driving-wheels. By this arrangement the energy of the armature is utilized practically almost directly upon the periphery of the driving-wheels. The speed of armature to drivers is as 9 to 1. Therefore, as the wheels must make 500 revolutions to the mile, the armature makes 4,581 revolutions. The ratio of peripheral speeds, however, of armature to drivers is as 3.27 to 1. As high speed is the normal condition of an armature, no real sacrifice is made to gain leverage. The speed of armature for 8 miles an hour, the limit the law allows, is 610. To take up all back lash of gears the motor is arranged with pivoting bearings at one end and a regulating screw at the other, both resting upon heavy pieces of rubber. This pivoting arrangement is again advantageous in case of repairs or inspection through accident, the large gears being held in place by means of a set-screw and long spline. On loosening the set-screw they can be easily moved along on the axle, freeing the small gears. The motor then can easily be raised to a vertical position, allowing free inspection. The total weight of the "Morse," as the car is called, is about 4,200 pounds. The wiring and controlling mechanism is equally as simple and substantial. No. 4 B. & S. underwriter's wire is used throughout. It is run in grooved sheathings and covered, so that no wire is to be seen excepting at the motor. Every precaution was taken to obviate any danger arising from moisture or short circuits. The controlling device consists of four heavy brushes bearing upon a stout frame of soapstone carrying broad and properly-shaped contact pieces. This whole is inclosed in an 8-in. by 16-in. iron box, with an ordinary engineer's handle and guide.

Four movements are made, controlling the combination of the field magnets, which vary from .39 to 2.75 ohms. The resistance of armature is .24 ohm. By proper connections with the switch, it can be readily seen that the motor can be slowly and easily started, stopped or run. By turning either to the right or left a small handle placed just to the left of the main switch, one of two pairs of brushes is brought to bear on the commutator, thus giving the directive motion to the armature, and obviously to the car. Another switch just to the right of the main switch is a dead cut-off controlling the main current coming from the contact wheel. This is placed underneath the car, and consists of a heavy 14-in. wheel of phosphor-bronze free to slide 4 in. to the right or left, and rotating freely upon its shaft. A deep groove is cut into the rim, fitting the centre rail. By a lever and a heavy spring a constant pressure tends to keep the wheel down on the rail. By this arrangement the wheel can adapt itself to every curve or change of level of the rail. An ordinary hand brake is placed in the car just to the left of the switches. By this handy arrangement one man, with a little practice, can easily manipulate the switches and brake, and so control the car. Before shipment the car was thoroughly tested and worked admirably.

#### How He Outwitted a Traffic Manager.

An amusing incident occurred not long since at the terminus of one of our Irish lines, illustrating in a remarkable manner the truth of the old adage that "Necessity is the mother of invention." An elderly lady en route to the seaside arrived at the railroad terminus with a profusion of luggage, as is customary on such occasions, and immediately attracted the attention of the railway porter, who considered her to be a very good mark for the forbidden gratuity. Having safely deposited her luggage in the carriage, and the old lady to boot, he observed by a fumbling motion that she was going to reward him for his attentions. He glanced around the platform and to his dismay observed the official eye was on him. To put out his hand for the gratuity meant instant dismissal. A bright idea flashed across his fertile mind. It was but the work of an instant to dive his head into the carriage window under the pretext of inquiring if the old lady's luggage was safe, but in reality to request the old lady to place the silver coin in his mouth, and having thanked her for helping him out of his difficulty, away he went, rejoicing at having outwitted his traffic manager.—*London Railway Official Gazette.*



BOILER DRILLING MACHINE.





Published Every Friday.

## EDITORIAL ANNOUNCEMENTS.

**Passes.**—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

## THE COURSE OF GRAIN EXPORTS.

The Bureau of Statistics reports as follows the breadstuffs exports of the last two fiscal years ending June 30:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Flour, bbls. . . . .	10,347,629	8,708,152	+ 1,639,477	18.8
Flour, bu. . . . .	46,504,330	39,186,684	+ 7,317,646	18.8
Wheat, bu. . . . .	82,449,014	68,241,759	+ 14,207,255	20.8
Corn, bu. . . . .	51,361,583	44,799,061	+ 6,562,522	14.6
Oats, bu. . . . .	3,921,078	1,707,506	+ 2,213,572	129.0
Rye, bu. . . . .	2,950,541	6,208,159	- 3,257,618	52.5
Cornmeal, bu. . . . .	1,021,004	982,048	+ 38,956	4.0
Oatmeal, bu. . . . .	1,806,807	1,341,956	+ 464,851	34.6
Total, bu. . . . .	190,074,357	162,467,173	+ 27,607,184	17.0
Total value. . . . .	\$155,014,860	\$155,507,907	- \$493,047	0.3

Thus in the aggregate we exported 27,600,000 bushels more grain last year than the year before, but received for it \$493,000 less money. There was an increase in the quantities of every grain exported except rye, but by far the larger part of the increase was in wheat and flour, in which it was 21,584,901 bushels, or three fourths of the whole, the new corn crops having as yet not had a great effect on the exports, or rather having made up only in the last six months (during which alone it has been exported) for the very light exports of the first six months of the last fiscal year. Thus the corn exports in the two halves of the fiscal year have been:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
July 1 to Dec. 31. . . . .	13,428,941	25,685,965	- 12,257,024	47.7
Jan 1 to June 30. . . . .	37,922,642	19,113,096	+ 18,809,546	98.4
Fiscal year. . . . .	51,361,583	44,799,061	+ 6,562,522	14.6

Thus the new crop since it matured has actually nearly doubled the exports, and therefore has been much more effective than the figures for the whole year would indicate.

For the twenty years since the war the quantities and values of the total grain and flour exports have been:

Year.	Bushels.	Value.	Year.	Bushels.	Value.
1865-66. . . . .	32,680,419	\$39,592,067	1875-76. . . . .	138,628,829	\$139,026,980
1866-67. . . . .	29,720,151	37,764,900	1876-77. . . . .	135,994,071	115,653,571
1867-68. . . . .	30,513,209	37,351,840	1877-78. . . . .	191,210,928	178,257,262
1868-69. . . . .	38,630,455	52,235,299	1878-79. . . . .	246,611,507	207,115,059
1869-70. . . . .	56,610,720	70,597,846	1879-80. . . . .	284,707,908	283,039,452
1870-71. . . . .	63,819,573	78,009,953	1880-81. . . . .	323,186,443	297,364,659
1871-72. . . . .	75,390,038	83,006,974	1881-82. . . . .	168,009,879	180,509,407
1872-73. . . . .	93,995,932	97,232,877	1882-83. . . . .	102,558,635	206,657,028
1873-74. . . . .	130,493,088	150,590,078	1883-84. . . . .	162,467,173	155,507,907
1874-75. . . . .	103,790,808	109,679,302	1884-85. . . . .	190,074,357	155,014,860

Thus we see that though the grain exports were 17 per cent. more in quantity last year than the year before, with the exception of 1883-84 and 1881-82 they were the smallest since 1876-77, the year of the deepest industrial depression of this generation; while the value of the exports last year was less than in any other since the year last named, and \$128,625,000 (45 per cent.) less than in 1879-80, when these exports were largest and there was the greatest activity and prosperity in business. For the five years from 1878-79 to 1882-83 the quantity of exports averaged 235 million bushels and the value 229 million dollars. The de-

crease from this average value, in the last two years, has been about one-third, amounting to 76 million dollars, which is a very considerable matter, even for this great country.

The exports of flour, wheat and corn, which make up by far the larger part of the total, have, in each of the last ten years, the quantities, in millions of barrels and bushels, and the value in millions of dollars:

Year.	Flour.	Wheat.	Corn.	Flour.	Wheat.	Corn.
1875-76. . . . .	3.9	55.1	74.8	24.4	68.4	92.8
1876-77. . . . .	3.3	40.9	57.0	21.7	47.1	68.8
1877-78. . . . .	3.9	72.4	93.1	25.1	66.9	122.0
1878-79. . . . .	5.6	122.4	147.7	29.6	130.7	160.3
1879-80. . . . .	6.0	153.3	180.3	35.3	180.5	225.9
1880-81. . . . .	7.9	150.6	176.3	45.0	167.7	212.7
1881-82. . . . .	5.9	125.3	121.9	36.4	112.9	149.3
1882-83. . . . .	9.2	106.4	117.8	51.8	119.9	174.7
1883-84. . . . .	8.7	98.2	107.4	46.3	72.9	121.2
1884-85. . . . .	10.3	82.4	120.0	50.6	71.1	121.7

The flour exports have increased greatly since 1879-80, when the wheat exports were greatest. Compared with that year, the flour exports last year were 70 per cent. greater, while the wheat exports were 46 per cent. less, and there was a decrease of 28½ per cent. in the aggregate of flour and wheat. Only 15 per cent. of the aggregate was exported in the form of flour in 1879-80, against 36 per cent. last year.

The corn exports last year were the largest for four years, but they were only a trifle more than in 1875-76, and very much less than in any of the five following years, and no less than 47½ per cent. less than in 1880-81, when they were largest. As before said, however, we have the effect of last year's large corn crop during only one half of the last fiscal year, and we may expect for the current half-year a nearer approach to the exports previous to 1882 than we have had since that year. For the six months ending with June the corn exports for 11 years have been, in millions of bushels:

1875.	18.6	1877.	1879.	1880.	1881.	1882.	1883.	1884.	1885.
14.4	33.0	38.5	51.6	49.7	62.2	30.8	10.2	35.4	19.1

It is true that in 1883 the exports in this half of the year were nearly as large as they have been this year; but the exports for the second half of 1883 were checked (were only 25.7 millions) because of the very light crop that year, the old corn being kept for home use. In 1881, though the crop was then the worst for many years, 33 million bushels were shipped in the last half of the year; in 1877, when there was a fair crop both preceding and following, and the exports of the first half of the year were nearly the same as this year, the exports of the second half were 34 millions, and we ought to be able to spare at least as much as that this year, which would bring up the exports from the last crop to about 72 millions, which is nearly as much as in 1881, from the large crop of 1880, and more than in any subsequent year. The largest corn exports in the last half of the year 52 million bushels in 1880, 36 millions in 1879, and 36½ millions in 1878; in no other year more than 34 millions. Thus, there is a fair prospect that our corn exports for the current half-year will compare well with those of the corresponding period in any previous year except 1880.

The wheat exports for this half-year will depend very largely upon the crops now being harvested, which will be the smallest since 1876, and, in spite of large stocks on hand, will not permit as large exports as in most previous years. In all years much the larger part of the value of the cereal exports came from wheat, for the last seven years from 77½ to 85 per cent. of the whole, and last year 78½ per cent. Thus the prospect of large corn exports does not make good the probable light wheat exports. The effect of a second large crop of corn, however, may be much greater in exports of provisions than on corn itself.

We see from the above figures that the values of the exports last year were small in proportion to their quantity, and this though wheat, the cereal of highest price, made a larger proportion of the total quantity than in most other years of large exports (68 per cent. last year, 78 in 1882-83, 66 in 1880-81, 63½ in 1879-80, 60 in 1878-79, 49 in 1877-78). This was due to the very low average price. This average price is of great importance, not only as indicating the income of the producers from their grain, but also the inducements for an extension of grain-growing in this country. The values reported are those at the point of export. Those previous to 1879 were reported in greenbacks, and we have been to the trouble of reducing them to gold values, which alone makes possible a profitable comparison with the following years:

Export Values per Barrel and per Bushel for Twenty Years.

Year.	Flour.	Wheat.	Corn.	Year.	Flour.	Wheat.	Corn.
1865-66. . . . .	5.94	0.99	0.53	1875-76. . . . .	6.45	1.09	0.59
1866-67. . . . .	6.30	0.90	0.71	1876-77. . . . .	6.10	1.18	0.59
1867-68. . . . .	7.10	1.36	0.81	1877-78. . . . .	6.20	1.37	0.55
1868-69. . . . .	5.60	1.01	0.74	1878-79. . . . .	5.25	1.07	0.47
1869-70. . . . .	4.93	1.04	0.74	1879-80. . . . .	5.88	1.24	0.54
1870-71. . . . .	5.86	1.18	0.68	1880-81. . . . .	5.60	1.11	0.56
1871-72. . . . .	6.37	1.31	0.62	1881-82. . . . .	6.15	1.18	0.67
1872-73. . . . .	6.57	1.14	0.54	1882-83. . . . .	5.90	1.13	0.68
1873-74. . . . .	6.38	1.28	0.64	1883-84. . . . .	5.55	1.07	0.61
1874-75. . . . .	5.31	1.00	0.75	1884-85. . . . .	4.89	0.96	0.54

In none of these years do we find the flour and

wheat quite as large as last year. The highest wheat value was in 1877-78, which did much to encourage the great increase in production in the following years, this production having been, in millions of bushels:

1871. . . . .	230.7	1876. . . . .	289.4
1872. . . . .	250.0	1877. . . . .	405.0
1873. . . . .	281.3	1878. . . . .	420.0
1874. . . . .	309.1	1879. . . . .	450.5
1875. . . . .	292.1	1880. . . . .	498.5

The yield was unusually good in 1877, and the price unusually high, and the acreage sown increased steadily thence till 1881. But it is noticeable that the increase of production was not checked by the low prices of 1878-79, which, however, were much higher than present prices.

Next to the largest wheat exports (including flour) were in a year (1879-80) of comparatively high prices.

The average value of the corn exported last year, though much less than for the three years of light crops previous, was nearly the same as in previous years of large exports. We should expect last year's average, however, to be made up of a high price in the last half of 1884, when the exports were from the scanty stock of old corn, and on low prices in the first half of this year. This, however, was not the case. The average value in the first half of this year was but a cent a bushel less than the average for the whole year, and for June it was 56 cents, or two cents above that average.

As the prospects for the current year depend largely on present prices, we subjoin the average values of the exports as reported for June, the six months ending with June, and the 12 months ending with June, as follows:

	1884-85.	1883-84.	1882-83.	1881-82.	1880-81.	1879-80.	1878-79.	1877-78.	1876-77.	1875-76.
12 mos. to June 30.	\$4.89	\$0.86	\$0.54	\$5.55	\$1.07	\$0.61	\$0.53	\$0.87	\$0.53	\$0.53
June. . . . .	4.78	0.87	0.53	5.45	1.03	0.61½	0.53	0.87	0.53	0.53
June. . . . .	4.87	0.94½	0.56	5.33	1.00½	0.62	0.53	0.87	0.53	0.53

The chief change is an advance in the value of wheat in June, when it was but 6 per cent. less than last year at the same time, while for the last half-year the price was 15½ per cent. less than last year, and for the year 20 per cent. less. The price of corn in each period has been about 10 per cent. less than last year.

There is thus a prospect that for what wheat we have to spare of this crop we shall get a better price than we got for last year's surplus; and as for corn, the price is now as good as in the years of our largest exports and greatest prosperity. There is, however, scarcely a possibility that the country will profit as much from the grain exports of this fiscal year as it did from those of 1878-79 and subsequent years, which did so much toward making the good times that followed. Indeed, unless there shall be an advance in prices, of which there is now no sign, we shall do well to make any increase over last year; we may possibly export a great deal more corn, but the crop of wheat promises to be 150 million bushels less than last year, and whatever the surplus from the last crop, we shall probably have a considerable decrease in our wheat exports. An increase of 47 millions in corn would bring us up to our maximum (in 1879-80), but this would be worth only about \$25,000,000, or less than 27 millions of wheat and flour at the June price, and a much greater reduction in the wheat exports is possible, and would bring them down only to 102 millions, while in 1883-84, after a crop 57 millions greater than is now promised, the exports were only 107½ millions.

## THE CROPS.

The most important of these is corn, with the exception of grass. It covers more ground than all the other grain crops put together. On the average, it is the safest of them all; but last year was the first fair one for four years, and the yield was not very large last year—only fair on a large acreage. The July report of the Department of Agriculture indicates that 6 per cent. more was planted this year than last, which brings up the area to 73,865,000 acres, or 18.4 per cent. more than in 1879, when the crop was 1,755 millions of bushels. At that rate (which was unusually favorable) we should have 2,078 millions this year. The crop is a little late, generally in pretty good condition, but generally not in first-rate condition. The hot July brings it forward very rapidly. Great increases in acreage are reported in several old states, chiefly due to its taking the place of winter-killed wheat. Thus there is an increase over last year of 7 per cent. in Virginia, 12 per cent. in West Virginia, 10 per cent. in Tennessee, 9 in Kentucky, 6 in Ohio, 8 in Indiana, 7 in Illinois and 10 each in Kansas and Nebraska. The condition July 1 was generally excellent in the South (103 in Texas and Kentucky, and not far below par in the great corn states of the West, except Missouri (87) and Kansas (83), reaching 106 in Indiana and 97 in Nebraska. It has generally improved since.

The Department's reports do not show the winter



wheat acreage. They show that about 26,300,000 acres were sown, against 28,600,000 in 1884, and that a very large amount, which is spoken of as "millions of acres," were plowed up in the spring, we should judge not less than 10 per cent. of the sowing, which would bring down the area harvested to 23,670,000, against 28,600,000 in 1884, and 26,400,000 in 1883, when between 5 and 6 per cent. of the area sown had been plowed up. The whole reduction in acreage from last year on this basis is  $17\frac{1}{2}$  per cent., which in itself accounts for 88,000,000 bushels of the total decrease of 149,000,000 in the winter wheat crop which the Department estimates, leaving an average yield of  $8\frac{1}{2}$  bushels per acre for what was left to harvest, against about 13 bushels last year.

The area of spring wheat this year is about 11,100,000 acres, against 10,900,000 in 1884, and 10,000,000 in 1883. The prospects July 1 were thought to warrant a crop of 153,000,000 bushels, against 156,800,000 bushels last year. There was (and is) time for a considerable change in either direction.

In oats an increase of 4 per cent. is estimated, making 22,150,000 acres, against 21,301,000 last year, 20,325,000 in 1883, and 18,495,000 in 1882.

A decrease of about 4 per cent. in rye and no change in barley are indicated.

In cotton the average is about 18,400,000, and 5.7 per cent. more than last year. It is generally in fine condition, and if nothing happens may easily give much the largest crop ever picked, but there is still time for something to happen, though much more than half the dangers of the season are escaped.

The average this year compared with last is as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Winter wheat.....	23,670,000	28,600,000	- 4,930,000	17.2
Spring wheat.....	11,100,000	10,900,000	+ 200,000	1.9
Corn.....	22,150,000	21,300,000	+ 850,000	4.0
Oats.....	22,150,000	21,300,000	+ 850,000	4.0
Rye.....	2,107,000	2,195,000	- 88,000	4.0
Barley.....	2,426,000	2,426,000	—	—
Total grain.....	135,318,000	135,106,300	+ 212,300	0.2
Cotton.....	18,400,000	17,419,000	+ 981,000	5.7
Grain and cotton.....	153,718,000	152,525,300	+ 1,193,300	0.8

This is not by any means an encouraging showing; we have substantially the same acreage of grain this year as last, the great decrease in winter wheat having exceeded the great increase in corn. So far as the original decrease in winter wheat sown is concerned, it should be made good by other crops, and very nearly all the part of that crop which has been plowed up. If this has been the case, then the practical effect of the failure of the wheat has been to prevent an extension of other crops. It has that tendency, because it requires the ground to be prepared and planted twice, instead of once, and so takes time, of which there is little to spare on farms; but we are surprised to see that it has had so great an effect.

The acreage in grain and cotton in each of the last seven years has been:

Year.	Grain.	Cotton.	Total.
1879.....	118,665,000	14,388,000	133,053,000
1880.....	120,926,000	16,120,000	137,046,000
1881.....	123,388,000	16,851,000	140,239,000
1882.....	123,721,000	16,276,000	140,000,000
1883.....	129,676,000	17,449,000	147,125,000
1884.....	135,106,300	17,419,000	152,525,300
1885.....	135,318,000	18,400,000	153,718,000

Thus the increase in acreage of these crops has varied from 1,750,000 to 6,100,000 acres until this year, when it is but 1,164,000. The increase in grain acreage has not been less than 2,300,000 until this year, when it is but 213,000. It is hard to believe that there has been any such arrest in the growth of farming, making all allowances for the destruction of winter wheat. If none had been destroyed, the increase in grain acreage would be 2,873,000, against 5,430,000 the year before, and 3,955,000 from 1882 to 1883. The gain last year may have been exaggerated by the Department report, which gave the wheat acreage as 38,500,000 in the spring and summer, and nearly a million more in the final report.

#### POOR STEEL RAILS.

The Chief Engineer of the Michigan Central Railroad in another column relates under this heading a sad experience, but one which we fear is less rare than his letter implies. He finds that rails bought under a "guarantee," but not otherwise tested for physical qualities on behalf of the buyer, do not survive their guarantee nor anything like it, but speedily begin to degenerate into an unserviceable condition. That the case is rarely quite so bad as he describes (new rails beginning almost immediately to crush or "flow" at the joints in the manner shown in the drawing which appears with his letter) we may well believe, for otherwise we might soon have to consider the question of returning once more to iron rails for durability. Nevertheless, even this particular experience on the Michigan Central

is not a new one. As long ago as June 6, 1879, the *Railroad Gazette* published engravings and details of a precisely similar case,\* where some comparatively new steel of one particular month's rolling crushed badly at the joints, while steel of earlier rollings showed no such tendency, and steel of later rollings but little of it. In fact, it was stated in the very beginning of that paper that this trouble is more or less common to all rails, although it becomes serious with few, as follows:

"The fact was developed that end sections are quite unreliable as a guide to the average wear, the joint being invariably more worn than at any other point. Diagrams A [twelve double sections] show a series of sections giving a comparison of these end and mid sections, for all but one or two of which the joints were apparently worn perfectly even with the rest of the rail. No difference in respect to this wear at joints could be detected between the various joints in use, \* \* \* (all) comparing equally well with each other in this respect.

"This increase of wear, however, does not, with rare exceptions, degenerate into a battered joint, but after reaching a certain depression in the joint the wear continues about uniform. The same is true in great degree of blemishes which develop in the middle of the rail. Several were pointed out which were stated to be in worse condition several years ago than now."

From this it would appear probable that the "crushed ends" which occur, "to a slight extent," in Mr. Hawks' earlier laid rails are, in part at least, instances of this invariable law of a slight extra wear at joints, which does not ordinarily tend to increase or become serious, and that the really grave defects are confined for the most part to rails of recent layings.

The engraving in another column does not exaggerate the gravity of either of these cases of failure at the joint, nor does it appear that they can properly be attributed in either case, even in part, to special defects of track or joint. The crushing is not in any sense a lamination or cracking in the style of the old iron rails, but an actual deformation of section, such as would result from much lighter loads in much shorter time if the rail were made of lead, as one at first sight suspects it may be. It is simply an example of "cold-flowing," which is a property of all metals under sufficient provocation, but not of fairly good steel rails in ordinary service, to any objectionable extent.

It would be interesting to know to what extent this particular kind of excessive badness in rails has developed; but that there is any mystery about either the cause of it or the remedy for it we do not perceive. The rail is, "in short, too soft," as Mr. Micawber would say, and any test which will reveal the softness will reveal the badness. This, so far as the consumer is concerned, is all that he needs to know. It is for the manufacturers and not the consumers to "walk the floor" in thought as to how to correct this particular defect without injuring the rail otherwise. As millions of tons by dozens of makers have been rolled in the past twenty years, and are still being rolled, which do not show this defect, it must be absurd to suppose that this is too hard a demand, or that there can be any permanent reason why "no satisfactory assurance" can be given that "their present product will show any better results."

That there is even any need for "some new test to develop this new weakness" seems more than doubtful. So far as the buyer is concerned, we imagine, in fact, that a sufficient remedy for this and all other physical defects will be found in "the old-fashioned mechanical tests" alone, if intelligently made by the buyer and not by the manufacturer. Mr. Hawks indeed says that "the rails stand the old-fashioned mechanical tests well," but as we learn that in saying this he simply "tells the tale as it was told to him," we must confess that—frankly speaking—we do not believe a word of it. Some of these "old-fashioned tests" they may have sustained—the sample now before us looks, for example, as if it might bend readily enough to almost any angle desired—but, in default of evidence to the contrary, we cannot feel a doubt that they will fail under enough of the simpler recognized tests to enable any intelligent inspector to detect at once, by comparison with the behavior of rails of known good quality, that it is unfit for service; for it is inconceivable that a rail which is crushed and distorted so easily in actual service will not be crushed and distorted so easily in a testing machine as to reveal its imperfections, either under the drop test, or bending test, or shearing test, or torsion test, or (which seems far more probable) under all or most of these together. The crying necessity seems to be, not for a new test, but for inspectors to make the old tests. New tests or old tests alike will always prove inadequate to reveal to a manufacturer that his rails are bad "before they leave the mill," if he even hopes they will be good

enough barely to pass muster, or to make him take more pains to give good rails than his buyers take to get them—which is, in too many instances, none at all. To say this is not making a charge against manufacturers, but rather against railroad officers, for nothing else can well be hoped for when the utterly unreasonable demand is made upon manufacturers that they shall not only furnish buyers with the kind of rails they want, but shall find out for them what they want. That is precisely what the method of evading just responsibility known as "buying on a guarantee" amounts to, and it will in later years seem incredible (let us hope) that such carelessness could have existed in making such important purchases as is now the rule and not the exception on American roads; and not only in buying rails, but wheels and other such manufactures.

Nevertheless, if a new test be deemed essential, it would seem as if there should be no great difficulty in getting one. There are indications on the specimen before us that even a hammer and cold-chisel might be made to serve one's turn on a pinch, for the nicks made for breaking it off are of a depth and have produced an amount of distortion which we have rarely seen equaled. It is, of course, possible that the blows were of unusual force, but the more reasonable probability seems to be that almost any process of indentation under impacts of known force which might be chosen would show immediately an unmistakable difference between rails which were, and those which were not, too soft to render good service. Not that this test alone would suffice as a protection against the evils complained of. If this test alone were used, no doubt the immediate effect would be that rail-makers would go to the opposite extreme, and our last state would be worse than the first; but if at the same time other tests were used to guard against other imperfections, the rail-makers would have some definite standard to go by, and could regulate their process of manufacture accordingly. As it is, we are unable to present the natural results more clearly than in the following extracts from a recent editorial,\* written before this particular difficulty had been heard of, to which it lends a new force:

"There are certain clear indications in the scattered facts presented which go to show that those roads which make such tests have had no difficulty in getting very good rails, both English and American, while those who do not make tests complain loudly in frequent instances of 'certain brands.' The plain moral is that buyers get not so much what they pay for as what they take pains to get; that the railroad company which buys rails without a rigid system of inspection has only itself to thank if it gets poor rails, and that when a majority, or even a considerable fraction, of the buyers buy without inspection, merely on the credit and word of the maker, they are doing all they well can to destroy the quality of the manufactures and to encourage poor manufacturers who either will not or do not know how to turn out a first-class article. We fear there is no doubt that whereas in England it is the exception to buy rails without some form of inspection and test, it has in this country heretofore been the exception to enforce or even attempt such tests. We apprehend that the buyers of no civilized country have as a class been quite so negligent in such matters as here. They could not well be more so, for many important lines have neglected absolutely to make any preliminary tests whatever. It would be but a natural result from this state of things that while many makers, held to a stricter account or favored by circumstances or by a naturally honest disposition, should turn out as good rails as are produced anywhere, a certain minority at least should turn out very poor rails indeed.

"Rigid inspection and test are particularly necessary in buying steel rails, because, to a far greater extent than was the case with iron rails, inferior quality is due to minute differences in processes of manufacture, originating in a lack of care and skill quite as often, possibly, as in deliberate intention to deceive or skimp the quality. With iron rails there was an immense margin for fraud in this respect. The difference between the cost of good and bad rails was very great indeed. With steel rails there is of course a similar margin, but it is a very much smaller one; so small that, at first at least, all prominent manufacturers intended to make equally good rails, their failures being due chiefly to the lack of skill; for the manufacture of Bessemer steel, although a much cheaper and simpler process than the manufacture of good wrought iron, is also a more delicate process, in which minute differences of watchfulness or skill make a great difference in the quality of the resulting product. It is too plain for demonstration that such watchfulness can only be properly looked for from the buyer, for it is too great a strain on human nature to expect any large number of manufacturers to exert themselves to acquire skill, not to speak of spending money, for the sake of producing a better article than their customers demand or take pains to secure, especially when the defects of the article furnished will, in the ordinary course of events, not be revealed for many years."

Passing from the consumer's to the manufacturer's side of the problem, however, and granting, for argument only, that this is a side of the problem which really concerns railroad men as such, it does not even from that point of view seem probable that there is any such dark mystery about the cause of these failures as Mr. Hawks' letter seems to imply. It is natural that a manufacturer who stands self-convicted of having sent out some monstrously bad rails should knit his brow over it, and declare, by all his converters and rolls that there was some mystery about it that "no fellow could find out," for he had taken more pains with that particular lot than with any others he had ever turned out. It is equally natural,

\* "Wear of Steel Rails on the Atlantic & Great Western Railroad. An Investigation of the Comparative Wear of Various Brands of Steel Rail as Affected by Grades and Curvature." By A. M. Wellington, C. E. Section No. 6, p. 306.

\* "The Wearing Qualities of Steel," *Railroad Gazette*, May 1, 1885.



however, that an aggrieved party should receive such declarations with a good many grains of salt, and we think with justice; for, while we do not propose to usurp the province of the manufacturer by attempting any definite solution of the mystery, there are several directions in which it may be reasonably looked for in this particular case under discussion. The chemical composition, for example, does not appear to be good; but, on the contrary, to be very bad indeed. As our article is already long, however, we may as well present some notes as to this matter separately.

#### Cotton Exports.

Our cotton exports are again more valuable than our grain exports, the latter, indeed, having stood first only in four years. The values of each, in millions of dollars, have been for 20 years (currency reduced to gold before 1879):

Year.	Cotton.	Grain.	Year.	Cotton.	Grain.
1865-66	198.2	29.0	1875-76	109.0	113.2
1866-67	142.4	29.2	1876-77	158.4	109.1
1867-68	109.2	49.3	1877-78	175.6	177.3
1868-69	117.8	38.9	1878-79	182.5	207.1
1869-70	183.1	58.3	1879-80	211.5	283.6
1870-71	194.4	70.7	1880-81	247.7	267.4
1871-72	161.3	75.5	1881-82	199.8	180.6
1872-73	197.6	85.9	1882-83	247.3	205.7
1873-74	188.6	143.9	1883-84	197.0	155.5
1874-75	169.0	98.8	1884-85	201.8	155.0

In every year until 1879-80, the cotton exports were worth more than twice as much as the grain exports, but in that year they were but 30 per cent. more, and in 1877-78 the grain exports for the first time were the more valuable; but this continued but four years, one of which, however (1880-81), was the year when the cotton exports were worth more than they have been in any other year. This change was due to the enormous increase of grain exports, the cotton exports having grown much less rapidly when they have grown at all. But the decrease in grain exports since 1880-81 has again left the cotton exports the larger, last year by 30 per cent. In the first ten years after the war the value of the cotton exports decreased 15 per cent.; that of the grain exports increased 241 per cent. In the last ten years there has been an increase of 18 per cent. in cotton and of 57 per cent. in grain.

It can hardly be said that there was any increase in the cotton until after 1878. Neglecting the exports of the first year after the war, when the price was extraordinary and stocks shut out from market during the war came forward, the exports for the 13 years from 1866-67 to 1878-79 averaged 163.7 million dollars in value, and were a little less than this in the last of these years. For the last six years the average has been 217.5 millions, an increase of 33 per cent.

The fact is, the South only fairly got on its feet in 1879, and not till that time was a considerable progress possible. If the last two years had not been unfavorable for cotton, this progress doubtless would have been more conspicuous.

This progress, however, is to be traced by the production rather than by the value of the exports, and by the acreage planted more than by either. The latter has been, in thousands of acres:

1873	10,806	1882	16,276
1876	11,641	1883	16,778
1879	14,588	1884	17,449
1880	16,120	1885	18,400
1881	16,851		

Thus the area planted is 5.7 per cent. more this year than last, 10 per cent. more than in 1883, and 13½ per cent. more than in 1882, when the largest crop ever known was produced. No other important crops of the country have been increased so rapidly.

This growth in the South contrasts strongly with the condition previous to 1879, when very little progress was made. We might suppose that a large increase in the production of cotton would have less tendency to overstock the market than a similar increase in grain, because the chief source of cotton supply is in a few states in this country, while all the world competes with us in the grain market. If we can find a market for our cotton, that may do for us now what the great increase in grain exports did for us after 1877.

There is no longer any doubt that a transfer of the control of the South Pennsylvania and Beech Creek roads has been made by the Vanderbilt interest to the Pennsylvania Railroad interest, and that the New York Central is assured control of the West Shore road, in which it seems probable that the Pennsylvania people had acquired a considerable interest. It has been reported that the agreement between the two companies covered a great many other things, as a permanent restoration of rates and the exclusion of the Baltimore & Ohio from New York, neither of which is within the power of these companies, and the last of which we do not believe either would attempt.

The grain movement since the opening of navigation has been, on the whole, somewhat larger this

year than in any of the three years previous. Reducing flour to wheat, the receipts of the eight North-western markets in each of the last four years have been, for the ten weeks from May 3 to July 11, in bushels:

1882.	1883.	1884.	1885.
36,203,205	47,131,862	43,485,128	48,670,207

The increase over last year is 12 per cent.; over 1883, only 3½ per cent.; over 1882, 34½ per cent. All the years but this followed light corn crops.

Flour receipts were lighter this year than in either of the two previous, notwithstanding a much larger production of wheat in the country which supplies most of the wheat for milling. For four weeks the flour receipts of the ten weeks have been, in bushels:

1882.	1883.	1884.	1885.
1,291,442	1,517,047	1,542,862	1,462,432

The decrease from last year is 5 per cent.; from 1883, 3½ per cent.

The wheat receipts meanwhile have been, in bushels:

1882.	1883.	1884.	1885.
7,218,331	7,034,278	6,907,080	9,253,179

This year the receipts were 34 per cent. more than last year, 30 per cent. more than in 1883 and 28 per cent. more than in 1882.

The receipts of wheat and flour together have been, in bushels:

1882.	1883.	1884.	1885.
13,029,730	13,910,989	13,499,959	15,834,123

The receipts of this year are 14½ per cent. more than last year or the year before, and 21½ per cent. more than in 1882.

Now the wheat crops of the years preceding these shipments were:

1881.	1882.	1883.	1884.
380,300,000	504,200,000	421,100,000	512,800,000

Thus the movement for the ten weeks was but 14½ per cent. more than last year, while the crop which supplied it was 22½ per cent. greater.

It was to have been expected that the corn movement should be very much greater this year than in any of the three previous, for the crops have been, in bushels:

1881.	1882.	1883.	1884.
1,194,300,000	1,617,000,000	1,551,100,000	1,795,500,000

And moreover the extraordinarily low rates this season have favored the marketing of it, as a very large part of it goes to domestic points for consumption, and most of this must go by rail. Now, the corn shipments since navigation opened (10 weeks to July 11) have been, in bushels:

1882.	1883.	1884.	1885.
15,255,548	19,733,139	14,734,040	18,260,074

The receipts thus, though 34 per cent. more this year than last, were 7½ per cent. less than in 1883, though the quantity of corn to be marketed must have been enormously larger this year.

Oats now make a very important figure in the grain movement, the amount grown having been largely increased since because of light corn crops, and because of the growth of population north of the corn-growing country. The receipts of oats at the North-western markets for the ten weeks in question have been:

1882.	1883.	1884.	1885.
6,891,134	11,351,903	13,528,868	13,342,690

Thus, in spite of the much greater supply of corn available, the receipts of oats were nearly as great this year as last, 18 per cent. more than in 1883, and 93½ per cent. more than in 1882, when there was a short supply of all grains.

The fourteen additional railroads reporting June earnings this week earned in the aggregate 3½ per cent. less than last year. They are nearly all small roads, and nine of them are Southern roads, including the six of the Richmond & Danville system, of which three made gains, aggregating \$21,747, and the other three losses, aggregating \$15,493, while two of the other three Southern roads show a decrease. None of the changes are very great, but there are three increases and two decreases of more than 10 per cent.

The aggregate earnings of 64 railroads that have reported for June so far have been:

Earnings.	1885.	1884.	Decrease.	P. c.
	\$16,526,216	\$17,210,332	\$684,116	4.0

In May the average decrease of the 75 railroads reporting was 8½ per cent. Some of the greatest roads have yet to report, and although the number is not great, their earnings are usually half as great as those of the 64 roads that have already reported. But it is quite probable that when all have reported, they will show a smaller percentage of aggregate decrease than in May, because in May last year their aggregate earnings were 5 per cent. more than in 1882, while in June they were 6 per cent. less. To do as well as last year was doing ill in June, while it was doing pretty well in May.

Belgium will celebrate the fiftieth anniversary of the opening of its first railroad Aug. 16 next by a proces-

sion in the streets of Brussels, designed to present to the eye the progress of the art of transportation from the earliest times till the present. During the preceding week, beginning Aug. 8, an "International Railroad Congress" will be held in Brussels, attended by delegates invited from different countries, to discuss a number of important subjects. The programme for this Congress we publish elsewhere. It appeared first in the Belgian newspapers in the last week of June, while a year's notice would have been none too great for a proper study of the subjects. A week seems a very inadequate time for the discussion of so many matters, but there will probably be some good things said.

#### June Accidents.

Our record of train accidents in June, given on another page, contains notes of 27 collisions, 44 derailments and 4 other accidents; a total of 75 accidents, in which 24 persons were killed and 115 injured.

Seven collisions and 7 derailments caused the death of one or more persons; 7 collisions, 9 derailments and 2 other accidents caused injuries, but not death. In all, 14 accidents caused death and 18 injuries, leaving 43, or 57 per cent. of the whole number, in which there was no injury to persons serious enough for record.

The 27 collisions killed 10 persons and injured 39; the 44 derailments killed 14 and injured 74, while in the 4 other accidents there were 2 persons hurt.

Twenty-three of the persons killed and 60 of those injured were railroad employés, who thus furnished 96 per cent. of the deaths, 52 per cent. of the injured and 60 per cent. of the whole number of casualties.

As compared with June, 1884, there was an increase of 4 accidents; a decrease of 16 in the number killed, and an increase of 12 in that injured.

These accidents are classed as to their nature and causes, as follows:

COLLISIONS:		
Rear .....	20	
Butting .....	7	
.....	27	
DERAILMENTS:		
Broken rail .....	2	
Broken bridge .....	3	
Spreading of rails .....	8	
Broken wheel .....	1	
Broken axle .....	5	
Broken brake-beam .....	1	
Accidental obstruction .....	1	
Cattle .....	4	
Wind .....	2	
Misplaced switch .....	5	
Purposely misplaced switch .....	1	
Malicious obstruction .....	1	
Unexplained .....	10	
.....	44	
OTHER ACCIDENTS:		
Boiler explosion .....	1	
Broken axle, not causing derailment .....	1	
Broken eccentric strap .....	1	
Car burned while running .....	1	
.....	4	
Total .....	75	

Three collisions were caused by misplaced switches, 3 by freight trains breaking in two, 3 by failure to signal following trains, 2 by engineers running trains in disregard for signals, and one each by mistake in orders, by a flying switch, and by a car blown out of a siding at night.

A general classification of these accidents may be made as follows:

	Collisions.	Derailments.	Other.	Total.
Defects of road .....	13	..	..	13
Defects of equipment .....	3	7	3	13
Negligence in operating .....	23	5	..	28
Unforeseen obstructions .....	1	2	1	4
Maliciously caused .....	..	2	..	2
Unexplained .....	10	..	..	10
Total .....	27	44	4	75

Negligence in operating is charged with 37 per cent. of all the accidents, defects of road with 17, and defects of equipment with 17 per cent.

A division according to classes of trains and accidents is as follows:

	Collisions.	Derailments.	Other.	Total.
To passenger trains .....	4	18	2	24
To a pass. and a freight .....	7	..	..	7
To freight trains .....	16	26	2	44
Total .....	27	44	4	75

This shows accidents to a total of 102 trains, of which 35, or 34 per cent., were passenger trains, and 67, or 66 per cent., were freight trains.

Of the total number of accidents 45 are recorded as happening in daylight and 30 at night.

The month shows the usual increase of summer causes of accidents, and the usual diminution of those due to cold and wet weather. Perhaps the only special feature is the number attributed to spreading of rails, which might be taken to indicate that rotten ties and defective fastenings are a warning that there is a limit beyond which renewals cannot be postponed, no matter how poor earnings may be.

Misplaced switches were the cause of 8 accidents in all, 3 collisions and 5 derailments. There were two malicious derailments, one by a purposely misplaced switch, and one by obstructions placed on the track.

The total number of accidents in the first and second quarters of this and last year, with the number of accidents from broken rails, were:

	1885.	P. c.	1884.	P. c.
Total. Bro. rails.	447	15.0	372	10.2
First quarter .....	67	..	38	..
Second quarter .....	218	8	235	3

Hardly any comment is needed on this table, which shows by its striking contrast the effect of the weather upon the number of accidents, and more especially its action upon rails.



For the year ending with June the record is as follows:

	Accidents.	Killed.	Injured.
July.....	89	25	142
August.....	80	38	112
September.....	100	21	174
October.....	105	39	170
November.....	96	47	130
December.....	105	24	109
January.....	145	24	182
February.....	216	44	259
March.....	86	17	84
April.....	81	14	75
May.....	62	8	65
June.....	75	24	115
Total.....	1,249	325	1,617
Total, same months, 1883-84.....	1,436	447	2,028
" " " 1882-83.....	1,604	431	1,988
" " " 1881-82.....	1,323	412	1,473

The yearly average for the four years was 1,403 accidents, 404 killed and 1,702 hurt, the year just closed being thus much below the average. The monthly average for the year was 104 accidents, 27 killed and 135 injured, June being also below this average in all respects.

The averages per day were, for the month, 2.50 accidents, 0.80 killed and 3.83 hurt; for the year, 3.42 accidents, 0.89 killed and 4.43 injured.

The average casualties per accident for the month were 0.320 killed and 1.533 hurt; for the year they were 0.260 killed and 1.295 injured.

The through shipments eastward of flour, grain and provisions from Chicago in the week ending July 18 for six successive years have been, in tons:

1880.	1881.	1882.	1883.	1884.	1885.
31,589	62,638	22,599	27,603	30,896	32,391

Thus the shipments this year were larger than in any other since 1881, but only a little more than last year. This week the 20-cent rate went into effect this year, and it preceded an advance from 15 to 20 cents last year. The shipments from this time on last year reached 30,000 tons in but ten weeks until after the middle of September, and were generally less than in previous years.

The total shipments and the percentage going by each railroad in each of the last six weeks have been:

	June 13.	June 20.	June 27.	July 4.	July 11.	July 18.
Flour.....	3,617	3,843	4,916	4,972	5,474	5,044
Grain.....	30,488	31,223	21,562	24,892	20,804	19,128
Provisions.....	8,541	8,242	8,439	8,949	7,584	8,219
Total.....	42,646	43,308	34,917	38,813	33,922	32,391
Per cent.....						
C. & Grand T.....	14.4	21.4	11.3	9.5	10.8	11.9
Lake Shore.....	21.1	14.4	17.6	21.0	17.4	17.4
Nickel Plate.....	15.1	10.7	12.3	15.9	20.0	11.8
St. L. & P.....	11.4	15.7	14.4	11.5	7.6	9.7
Ch. & N. W.....	12.7	16.6	21.0	19.9	16.0	19.3
C. St. L. & P.....	8.5	7.4	7.7	6.0	7.8	7.5
Balt. & Ohio.....	9.2	6.3	8.3	9.1	8.6	10.1
Ch. & Atlantic.....	7.6	7.5	7.4	7.1	11.8	9.6
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

The decrease last week from the week before was 4½ per cent., and was chiefly in grain. It will be interesting to compare these, so far the smallest shipments of any week of the year, with those of the week ending April 12, which were the largest of the year, as follows:

	—Week to—			
	July 12.	April 12.	Inc. or Dec.	P. c.
Flour.....	5,044	22,108	— 17,064	77.2
Grain.....	19,128	54,188	— 35,060	64.7
Provisions.....	8,219	6,793	+ 1,426	21.0
Total.....	32,391	83,089	— 50,698	61.0

Thus while the total shipments have decreased no less than 61 per cent., the provision shipments have increased 21 per cent.; and this is no temporary phenomenon: the average provision shipments for the six weeks ending July 18 were 8,329 tons, while for the six weeks ending April, which came next after the winter packing season, the average weekly shipments of provisions were but 6,413 tons.

The percentages last week were not particularly notable; the three Vanderbilt roads together carried 41.9 per cent. of the whole; the two Pennsylvania roads, 26½ per cent. The reports are that the 20-cent rate was generally adhered to in making new engagements last week. It is usual, however, when rates are advanced, that the bulk of the shipment reported for the first week of the advance are taken at the old rate.

For the half-year ending with June the exports of rails from Great Britain to the United States for seven successive years have been, in tons:

1879.	1880.	1881.	1882.	1883.	1884.	1885.
7,730	125,578	157,824	121,801	32,355	10,701	4,843

We have here the rise and fall of this business, which has substantially ceased, none being reported in June last.

The exports to other countries in June were 50,292 tons, about 10 per cent. less than last year and 33½ per cent. less than in 1883.

The Pennsylvania Railroad Company issued last April a circular "in regard to disinfection," specially in view of the possible appearance of cholera in this country. This circular lays most stress on the necessity of cleanliness on all premises of the company, enjoining the burning of decaying matter when possible, the washing of privies, the frequent flushing of drains and sewers, the ventilation and washing of passenger cars, and the cleaning of freight cars at stations. The avoidance of water that may be contaminated is advised, and boiling of it before use if pure water cannot be had. The circular also recommends the use of disinfectants as follows: 1. "P. R. R. disinfectant," which is supplied in bottles from the Altoona shops, and consists of a neutral solution of the normal chlorides of copper and zinc, 2,400 of zinc chloride and 120 grains of cupric chloride to an 8-oz. bottle, or 2½ lbs. of the zinc and 1½ ounces of the copper chloride per gallon of water. This solution is further diluted and used for washing out the seat, hopper, urinal and floor of car and other closets and privies, or with a bottle

to five gallons of water, for disinfecting a whole car. 2. Sulphate of iron or copperas, which is recommended when iron stain will not be detrimental, but not for floors, fabrics or painted surfaces. It is used by dissolving 2 lbs. in a gallon of water and pouring or sprinkling the solution where needed. 3. The battery residues from the ordinary batteries, with a pound and a half of salt to a gallon of residue, is recommended as an excellent disinfectant, which can be used in place of the "P. R. R. disinfectant." 4. Ice is recommended to prevent decomposition, and a lump should be kept in the urinal of passenger cars, a practice which is becoming common, and which greatly improves the atmosphere of the closet.

When a case of infectious disease is found in a car, it should be taken out of the train, locked, and not used again until it has been fumigated.

This circular found such favor with the Boston Manufacturers' Mutual Fire Insurance Co., of which Edward Atkinson is President, that it reprinted it, with the formula for the "P. R. R. disinfectant" and rules for its use, and distributed it among its members, as useful wherever precautions are to be taken by some central authority (as a mill company) to maintain sanitary conditions where numbers of people come together on its premises.

#### Record of New Railroad Construction.

Information of the laying of track on new railroads in the current year is given in the present number of the *Railroad Gazette* as follows:

*Atchison, Topeka & Santa Fe.*—This company's *Southern Kansas* line is extended from Atchison, Kan., southwest to Crisfield, 7 miles.

*Fremont, Elkhorn & Missouri Valley.*—Extended westward to Chadron, Neb., 31 miles.

*Oregon Improvement Co.*—This company's *Cedar River Extension* is completed from Renton, Wash. Ter., southeast to Green River, 24 miles. Gauge, 3 ft.

This is a total of 62 miles on 3 roads, making 1,219 miles thus far reported for the current year. The new track reported to the corresponding date for 14 years past has been:

	Miles	1878.....	Miles
1885.....	1,219	1878.....	900
1884.....	1,584	1877.....	751
1883.....	2,658	1876.....	1,910
1882.....	5,304	1875.....	538
1881.....	2,615	1874.....	839
1880.....	2,424	1873.....	1,872
1879.....	1,122	1872.....	3,237

This statement covers *main track only*, second or other additional tracks and sidings not being included.

#### NEW PUBLICATIONS.

*The Windmill as a Prime Mover.* By Alfred R. Wolff, M. E. John Wiley & Sons, New York.

The use of windmills in recent years has rapidly extended, largely on account of the many new and ingenious designs by American inventors, which have now brought the machine to a state of great mechanical perfection. Their greatest use has always been for pumping water, and their greatest use in that field, or one of the greatest, measured by horse-power, has been in this country pumping water for railroad uses. The number already in use for this purpose, it is stated, mounts up into the thousands, and their number is rapidly increasing.

The introduction of the windmill in fact has rather outrun the knowledge of it; for the present treatise is, if not the first, certainly the most careful and complete which has as yet appeared, and the only one, we apprehend, which gives anything like a complete list and description of the various leading types of American mills. The number of these which have obtained what may be called an established position is surprisingly great. Those described and illustrated in detail in this work number as many as twelve, viz. (mentioning them in the order in which they appear in the volume, which depends on mechanical construction and not on assumed merit): The Corcoran, Eclipse, Halladay, Althouse, Adams, Buchanan, Woodmanse, Stover, Champion, Regulator, Strong and Leffel. All these are fully and well illustrated, so that their practical merit can be judged of in every important detail.

The description of these and other windmills occupies 67 of the 151 pages of the volume. About half of the remainder is occupied by a clear and well written summary of what is known of the actual force of wind at various velocities (unfortunately still a somewhat doubtful matter), and by a discussion of the theory of the action of wind on windmill blades and of the best angle for the latter. The remaining space is given to a concise and practical summary of experimental results on the power and economy of windmills (with tables indicating that for light pumping it is in practice from 2½ to 10 times as economical as steam or hot air, all expenses included), and by useful tabular data on the capacity of pumps, friction of water in pipes, dimensions and weight of pipe, etc.

The book is an excellent practical treatise which "fills a void." The void may not be a very large one, but we should judge there were enough railroad men alone interested in the mechanics of water supply to give it something more than the "limited sale" which the author says is all that can be expected, in thanking his publishers for undertaking it. To many it will be highly useful.

#### TRADE CATALOGUES.

*Bolt and Nut Threading and Pointing Machinery.* Adams & Price Machinery Co., Chicago, Ill.

This very neat little catalogue is strictly business. The machines are illustrated and described in detail, so that their mechanical merits and demerits can be intelligently looked

into without the actual machine before one; and the special points of merit claimed are distinctly stated once for all on a single page, and in a two-page preface, the remainder of the pamphlet consisting merely of descriptions and engravings which can hardly fail to be of interest to railroad men unfamiliar with the tools represented.

#### State Railroad Management in Belgium.

[From "Railroad Transportation, its History and its Laws," by Arthur T. Hadley, a volume which will be published about the end of this year by G. O. P. Putnam's Sons, New York.]

Of all countries in the world Belgium probably offered the best advantage for a state railroad system. The industry of the country was active and varied. Of a large body of local traffic its railroads were thus sure; and they lay in a position to secure a large share of the transit trade between England and Germany. There was almost no possibility of mistake in locating the main railroads. The centres of industry were well defined; the main lines of trade almost equally well defined. The construction of railroads was easy a large part of the country being nearly level; almost to, easy, in fact, for the very facility of construction offered an inducement to competing or parallel railroads. The government was admirably suited for railroad supervision and management. It was enlightened and progressive, sufficiently centralized to be strong, yet popular enough to feel popular demands. The country was large enough to have an independent policy, not so large that local interests would be sacrificed to that policy. Its credit was excellent, so that it had no difficulty in raising whatever money was needed for public works.

Although Belgium was on the direct line between Germany and London, a large part of the traffic had gone *via* Holland because of the easy navigation of the Rhine to its very mouth. The substitution of rail for water as a means of communication gave Belgium the opportunity to compete for this traffic. The Belgian government was quick to avail itself of this opportunity. King Leopold was familiar with England and English business; he foresaw the probable future of the railroad, and he was all the more in a hurry to act, from the fear that certain hated Dutch capitalists might get the start of him. Railroad work was actively begun as early as 1833. The government chose the main lines of traffic and built its roads there; from Antwerp on the north to the iron and coal regions on the south; from Liège, near the German frontier, to Ostend, the most available point for shipment for England. Private companies were allowed to build lines whenever the state did not choose to undertake the work; they thus furnished a system of branches and connections. In the crisis of 1848 the government went so far as to subsidize some of these private lines. The system as originally designed was virtually complete in 1850.

The early arrangements were admirable for the time in which they were devised. But they were not changed to keep pace with progress elsewhere. The Belgian system of reports and statistics when first adopted was the best in the world; a generation later it was one of the worst. In their engineering arrangements, machine shops, etc., what was at first admirable precision soon became intolerable old-foggyism. The same conservatism for a time showed itself in the matter of rates. Down to 1853 there was no system of charges adapted to the wants of business; only the crudest kind of *pro rata* tariff, with little or no classification.

A radical change in this respect was made at the time when the competition of private companies began to make itself felt. The state stopped building railroads in 1850. Private companies began building faster than ever. For nearly twenty years the government system remained all but stationary, with a length of about 350 miles. The private railroads increased from less than 200 miles in 1850 to 700 in 1860, and 1,400 in 1870. This growth of private railroads was accompanied by their consolidation into powerful systems. Instead of being mere local branches or feeders to the state lines, they had now become rivals for the same through traffic; not quite so well situated, but strong enough to compete actively. With the year 1856 began a period of railroad wars. So far from exercising a dominant influence in railroad tariffs, the state was for the time being completely powerless against the current of events. It abandoned schedule rates, and had recourse to personal discrimination and to special contracts of every kind. It is probable that in these respects the state was a worse offender than the private companies themselves.

It is a curious fact that in any such competition the state is not stronger than private companies, but weaker. Theoretically it may have the power to forbid private companies engaging in such competition. Practically public opinion will not allow it to exercise that power. Nor can the state railroad exercise a dignified reserve. If private railroads are run to make money, and succeed in doing it, the state railroads must be run to make money too, or else the authorities will have to face the criticism of an indignant public. And in this money-making race it is impossible for the government to have the same quick elasticity of action as a private company. Thus it happened that the competition in Belgium was quite even. The state had somewhat better routes; but the advantages possessed by private companies in a business fight just about offset this difference.

During the times of active railroad war, the lowering of rates, especially for long distances and for low-class goods, was astonishingly rapid. The results obtained in Belgium in the years 1861-65 were even more remarkable than those reached in the United States some years later. The average freight charge per ton-mile was reduced to about 1.3 cents; average rate per passenger mile was even lower. The stress of competition developed such active business management



among the railroads that they were able to work with profit at these rates.

Yet this state of things, while seemingly good, was intolerable to the government. The competition of private companies gave it no chance for an independent policy. The political success was not what was generally supposed by the outside world. To Americans, the condition of the Belgian system at that time was known chiefly through the reports of the Massachusetts Commission, and this Commission, without the least intentional unfairness, were disposed to look at all these matters in a rose-colored light, because they were desirous that Massachusetts should follow the example of Belgium. They therefore accepted the Belgian authorities' reports of their own work, without subjecting them to criticism—a dangerous thing to do. The fact is that the Belgian state railroad system, during the time of active competition, was occupied with something else than questions of public policy. It was occupied with making money. It was a responsible and well-conducted company, managed on business principles. It differed from other companies only in the fact that its revenues accrued to the state, and its officials held their appointments from the state.

When the government wanted to obtain real influence as a railroad owner, it bought up most of the competing lines, and made long pooling arrangements with the remainder. This began in 1870; the largest purchases were made about 1873. In 1874 the government owned more than half the mileage of the country; in 1880 it owned two-thirds; now it owns about three-quarters. The Belgian system of 1885 is a totally different thing from the Belgian system of 1869.

In judging the railroad policy of Belgium by its results, all must unite in admitting that they are in many respects extraordinarily good. What their average rates are we have already seen. The passenger rates are lower than anywhere else in the world, except perhaps on some East Indian railroads. The freight rates are much lower than anywhere else in Europe. Nominally they are about the same as in the United States. Practically they are lower for almost any given service, because Belgium does not have the enormous long distance traffic which brings down the average in the United States.

Their classification is also excellent. They have now got matters into such shape that the schedules themselves (which go quite into details) furnish a system of rates adapted to the wants of different lines of business and of different localities. What their rates have done for the development of business is strikingly seen in the history of the port of Antwerp, which is rapidly outstripping the somewhat similarly situated French port of Havre—a difference which is thought to be largely due to the different railroad policy of the two countries.

It is also true that they make a great deal of use of their investment. The average car-load is higher than in either Germany or France, though the construction is the same. The high percentage of expenses to earnings, which is often quoted against them, is really, *prima facie*, in their favor. If a country where the state has a virtual monopoly of railroads shows too small a percentage of operating expenses, it gives good ground for the belief that rates are unnecessarily high, and that industrial interests are being sacrificed to financial ones.

On the other hand, it would be a mistake to use these results as a strong argument in favor of state management. The progress was made during a period of active competition, when private companies took the lead. The foundations were laid in 1853, when competition was beginning. The system developed itself most rapidly in 1861-65, when competition was at its height. Since the state has purchased rival lines and has had a virtual monopoly there seems to have been a diminution of activity, and a tendency toward slackness of management. There has been a lowering of profits without corresponding change of rates. Great complaints are made of the lack of cars where they are wanted. Much more serious charges are made by certain high authorities like Le Hardy de Beaulieu. He asserts that the connection between railroads and politics has produced distinctly bad results; that there has been a multiplication of forms and offices of no use in actual business, and that there have been serious manipulations of accounts to make an unduly favorable showing for the government. At this distance it is impossible to investigate these charges; but they have been made in official form by one of the best authorities in Belgium.

While not withholding the freest praise from the Belgian system, we may fairly ascribe much of its success to other causes than enlightened state management or deliberate public policy.

#### Experiments on Journal Friction and Train Resistance

We continue from our issue of June 5 the reprint of the chief deductions drawn from the experiments made with the apparatus illustrated in our issue of May 22.\*

**The Proportion of Rolling Friction in Railroad Service Due to Journal Friction Only.**—If the preceding conclusions may be accepted, the rolling friction proper in railroad service must be very small indeed, not exceeding 1 lb. per ton. No existing experiments bearing directly upon this question are known to the writer, nor is it easy to see how such can be devised. The only references, even, to the question which can be discovered are contained in Trautwine's "Pocket Book" and Thurston's "Friction and Lubrication." Mr. Trautwine ascribes 1 lb. per ton only to rolling friction. Professor Thurston, on the contrary, states that "frictional resistance on railroads is principally rolling friction," and even that "at low speeds axle and flange friction may probably

be neglected."† These statements, although positive, are not stated to be based on any other authority than deductive reasoning from the low coefficients of journal friction obtained in Professor Thurston's experiments, and it is confidently believed that they err in making too little allowance for the wide variations in journal friction which result from slight differences of conditions. Certainly they are inconsistent, not only with the results of the writer's tests, but also with a fact narrated in the same volume,‡ that the use of pure lard oil and the test of sperm for a certain time on a certain railroad had the effect to increase the number of cars hauled "about 10 per cent." It being now well determined, and universally admitted, that the total rolling friction of trains in service is only 4 to 5 lbs. per ton, such a result could hardly be exceeded if the whole rolling friction, both rail and journal, were wholly abolished, instead of merely alleviating what Professor Thurston declares to be an insignificant element in the total.

It also seems proper to note in this connection that no theoretical loss whatever exists from the compression of a per-

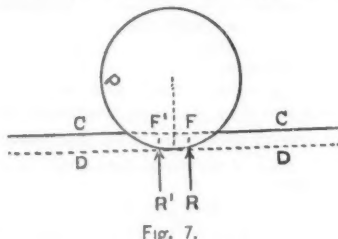


Fig. 7.

fectly elastic substance, such as a rail may be assumed to be, and to a great extent the entire permanent way as a whole, under a rolling load. In fig. 7, the compression at any point, whatever it may be, is proportional to ordinates from the line C C' to the periphery of the wheel P. The elastic resistance is in proportion to these ordinates, and the semi-segments F F' represent in magnitude and position the total elastic forces operating to retard and to accelerate. The resultants R and R' of these parallel forces must pass through the centre of gravity of these semi-segments F and F', and must each be equal to half the total load resting on the wheel. It follows clearly from the figure that the moments of these accelerating and retarding forces are equal, so that they neutralize each other.‡

**Resistance of Freight Trains in Starting.**—It will be seen in Table I. and fig. 2 (see issue of June 12) that the abnormally high co-efficient of friction at starting continues during the period of getting up speed, and thus constitutes an extra tax upon tractive power for some little distance after getting under way.

The following conclusions may, it is believed, be drawn:

1. The resistance at the beginning of motion in each journal is equal (as before stated) to about 20 lbs. per ton, or say 15 lbs. per ton over the average friction in motion. Except, therefore, for the "slack" which always exists in freight trains, enabling the cars to be set in motion one at a time, such trains as are usually hauled could not be started at all by the locomotive.
2. A velocity of 0.5 to 3 miles per hour, or, as an average, 2 miles per hour, must be attained before the journal friction falls to 10 lbs. per ton, or 5 lbs. above the average motion.
- The average during this period may be taken at 12 lbs. per ton.
3. At 6 miles per hour the journal friction is at least 1 lb. per ton higher than at usual working speeds. The average journal friction between 2 and 6 miles per hour may be taken as at least 2½, if not 3 lbs., per ton higher than the normal.
4. During the period of getting up speed, the normal law of acceleration of velocity is so interfered with by the varying co-efficient of friction that the velocity attained at any given point may be rudely taken as directly proportional to the distance run, so that the increase of velocity would be represented graphically by a right line instead of a parabola tangent to the horizontal line of normal velocity in motion.§

Assuming these facts, we have the following conditions in a freight train which is so heavily loaded that it may be assumed to have to run 3,340 ft., or ⅙ of a mile, to acquire a velocity of 10 miles per hour:

1. The average velocity will be 5 miles per hour, and the time occupied 7.6 minutes.
2. The increased tractive force needed to accelerate velocity only will be 2 lbs. per ton; since communicating that velocity is equivalent to lifting the train through 3.34 ft. vertically, and  $\frac{3.34}{32.2} = 0.10$  per cent. grade = a resistance of 2 lbs. per ton.
3. For one-fifth of this distance, or 668 ft., the total demand upon the tractive power is:  
2 lbs. per ton for acceleration.  
12 lbs. per ton for extra rolling friction.  
14 lbs. total additional traction, equal to a grade of 0.70, or 37 ft. per mile.

\* "Friction and Lubrication," p. 13.

† "Friction and Lubrication," p. 205.

‡ Since the preparation of this paper the point has been well taken, and demonstrated mathematically, that at high speeds the element of time comes in to modify the elastic resistances, increasing that in front of the wheel because it must be set in motion, and decreasing that behind the wheel because the elastic resistance requires time to act, and hence cannot follow up the wheel with its full force.

Any attempt to determine theoretically the amount as well as the nature of this loss would, of course, be impracticable. Its existence was, in a general way, pointed out by Mr. Don J. Whittemore in his discussion of this paper at the time it appeared.

§ It may be noted that this was very nearly the case in Messrs. Galton and Westinghouse's tests of retardation by brakes. See "Pennsylvania Railroad," by James Dredge—closing plate, where the line representing the speed makes a sudden drop as speed falls below 8 to 12 miles per hour.

4. For the next 1,336 ft. the total demand upon the tractive power is similarly found to be 4.5 to 5 lbs. per ton over the normal, equivalent to the effect of a 0.225 to 0.25 per cent. grade, or 12 to 13 ft. per mile.

These grades, therefore, represent the reduction at stations or stopping places which it is essential to make to fully equalize the demands upon the tractive power of locomotives while in motion and when getting under way. The fact that such heavy reduction of grade at stations may be said never to exist, while yet such heavy trains are hauled, must be due, in part, to the use of sand in starting, and in part to the fact that the full adhesion of the locomotive is not used up on the open road. To utilize to the utmost the power of locomotives, such reductions are believed to be the first thing which should be attended to in laying out a new road or in improving an old one.

**Effect of Temperature on Co-efficient of Friction.**—It will be noted in Table I. and fig. 2 that a high temperature exerted a very marked adverse influence upon friction at low velocities. Lack of exact notes on the temperatures reached prevents any further deduction than that, so far as they can be estimated, the results agree very closely with Professor Thurston's formula that the co-efficient increases as the square of the increase of heat over 90° to 100° F. at speeds under 12 miles per hour. No tests were made above that speed to confirm Professor Thurston's deduction that at higher speeds the law changes. Mr. Tower's tests were nearly all made at a constant temperature of 90°, and the effect of temperature does not seem to have been made a subject of investigation.

**Effect of Load per Square Inch of Bearing on Co-efficient of Friction.**—Comparison of the results obtained by the writer, and by Messrs. Thurston and Tower and others, as shown in figs. 2, 3, 4, 5 and 6 (issue of June 12), develop this curious fact: that while the results differ quite widely, in fact by several hundred per cent., in what may be called the typical or average co-efficient of friction, they all agree quite closely in finding that the effect of increased load, within working limits, is to very materially diminish the co-efficient. Mr. Tower, in fact, goes so far as to state, as one of the results of his tests, that it almost seemed at times as if it was approximately true that the absolute loss by friction was entirely independent of load, the co-efficient falling almost to half when the load was doubled. But it seems plain, from the diagrams given herewith, that this result is only true on account of the unprecedentedly low co-efficients which he obtained by his very perfect lubrication. Inspection of the diagrams will show that the general law of variation from increase of load is not materially different in the different tests, despite the wide variations in the average co-efficients.

**Effect of Velocity Over Twelve Miles per Hour.**—Figs. 2, 3, 4, 5 and 6, taken in connection, seem to show the following:

1. The velocity of lowest journal friction is 10 to 15 miles per hour.
2. With bath or other very perfect lubrication, there is a very slight increase of journal friction accompanying velocities up to 55 miles per hour (figs. 5 and 6).
3. With less perfect lubrication, as with pad or siphon, greater velocity is as apt to decrease as to increase the co-efficient (figs. 3, 4 and 6). The latter being more like the ordinary lubrication in railroad service, we may say, without sensible error, that the co-efficient of journal friction is approximately constant for velocities of 15 to 50 miles per hour.

This has been the assumption which all investigators of railroad friction, to date, have been compelled to make, and it is, in some respects, fortunate that it proves not far from true.

**Higley Roller-Journal Bearings.**—This apparatus is shown in fig. 8, and was also shown in fig. 7 of the writer's paper before referred to, giving a report of his gravity tests (see page 37, Trans. Am. Soc. C. E., 1879). The results deduced from the direct tests herein described, as shown in Table I., as compared with the gravity tests are as follows:

	Journal friction (pounds per ton) at velocity of		
	0 +	3 to 5 miles per hour.	10 to 20 do.
By direct tests, full load.....	4.9	3.1@3.5	2.7@2.2
" gravity ".....	4.0	3.3	2.8
By direct tests, light load.....	6.7	4.8@4.0	3.0
" gravity ".....	5.0	5.0	4.1

The correspondence between these tests, made as they were by such different methods, is thought to be very close and satisfactory. These later tests confirmed exactly the correctness of the writer's previously stated conclusions that the Higley bearing was nearly as efficient as theory would indicate in reducing initial friction, but loses nearly all of this advantage under speed.

The Higley bearing was then, and is now, in very extensive use on street cars, and was in use on several railroad cars at the time of the writer's tests. Mr. Higley's dissatisfaction with the results of the gravity tests was a principal reason why these later tests were undertaken, which fully satisfied that gentleman's doubts, as results could be seen with his own eyes, as weighed upon a scale, without having to accept the indirect (although, in fact, equally positive and valid) indications of computations based on electrical records of variations of velocity of rolling stock, when descending a known grade by gravity.

The discussion of the paper was very extended, and participated in by a dozen or more members. The following contain interesting notes of additional facts, to which alone we are able to give space:

**CHARLES PAINE (Past-President).**—We are quite in the dark as yet as to what increase of friction has been caused by raising the loads upon cars from 10 to 25 tons. Upon

\* Experiments with New Apparatus on Journal Friction at Low Velocities. By A. M. Wellington, C. E. Trans. Am. Soc. C. E., December, 1884.



the Lake Shore & Michigan Southern Railway, an increase in the maximum load from 10 to 15 tons per car, and of 4 tons in the average load actually carried, was not discovered by the locomotive drivers; on the contrary, much effort being made by the division superintendents to get the utmost performance out of their locomotives, the number of cars

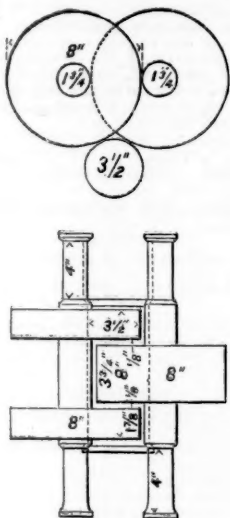


Fig. 8.

hailed by each engine was increased at the same time as the loads. This experience, with others, and the experiments given in this paper, make me think that the usual manner of estimating and stating the values of friction in pounds per ton is a misleading one, because the increase in load has so little effect in increasing the friction. Mr. Tower's remark, quoted in the paper before us, "that it almost seemed at times as if it was approximately true that the absolute loss by friction was entirely independent of load," may be taken to confirm this view, and is one which for other reasons deserves the attention of railroad engineers.

Some experiments of Mr. Dudley with his dynamometer car confirm Mr. Wellington's conclusions as to the great importance of lubrication as affecting train resistances. I may mention also, as confirming the views of this paper, that his experiments with stock trains upon the Erie Division of the Lake Shore & Michigan Southern Railway, where the grades do not exceed 13 ft. per mile, showed that the economical speed (so far as the demand upon the power of the locomotive was concerned) is about 18 miles per hour.

In considering the "resistance of freight trains at starting," Mr. Wellington's remarks are in favor of the present "slack" in freight trains, which may not be justified by experiment; at least we do not know how much, or rather how little, slack is necessary to permit each car to be started separately.

F. M. WILDER.—I am pleased with this machine for testing the friction, and think, following the general idea, attachments can be devised for getting the velocity, pressure and temperature graphically. As far as I have read and thought of the figures presented, and the conclusions drawn from them, I find they agree somewhat with conclusions which I came to from experiments made with the dynamometer, although I think the initial friction is too high for thoroughly lubricated car journals, as also the friction at speeds of 10 to 15 miles per hour. I have not had time to compare my figures, but I found, in substance, that the dynamometer showed on a level straight track, at a speed of 15 miles per hour, the total resistance through a distance of 2 to 3 miles was 3.25 lbs. per ton, as calculated carefully from a card which was made automatically, and with a train weighing 750 tons. Of course, the element of instrumental error for the machinery would be less with such large forces than with smaller ones.

The resistance in this case should be divided into journal and wheel and flange friction, and also atmospheric resistance; and I am satisfied this would bring the journal resistance down to about 2.5 lbs. per ton, with 300 lbs. per square inch of journal surface.

JOHN W. CLOUD.—It may, perhaps, be safely assumed that over 99 per cent. of the mileage of car journals is made with the journals and bearings in good order, and any one who has had extended experience with oil-testing machines and with railway rolling stock knows that "good order" in service means much better forces than can be had or maintained by wearing them in a testing machine where the bearings are frequently removed from the journals and dust has an opportunity to enter.

It follows that "good order" in service is a much more definite statement of condition than can be otherwise had, and I think nothing would be quite as satisfactory as axles drawn from service in good order and placed in the testing machine, with the bearings which had been worn to the journals in service, and if the results are to be applied to the resistance of railway trains as now run the journal box should be in place with its sponging during the test, or an equivalent will be placed under the journal to fulfill the same conditions. Otherwise, I think the resistances per ton shown by the testing machine may readily be 50 per cent. higher than they should be to represent average surfaces and lubrication.

On account of the extreme uncertainties of other resistances in railway trains besides journal friction, I cannot see that the results of total resistances of cars can be adduced to justify the accuracy and representativeness of journal frictional resistances as determined on this machine; in fact, I have frequently found with dynamometer car a total train resistance, in still weather, of 4 lbs. per ton with loaded cars and 5 1/2 lbs. per ton with empty cars, on level tangents at 10 miles per hour, which includes journal, track and air resistances; and I am, therefore, skeptical of the high figures given by Mr. Wellington as journal frictional resistances alone, as representing average service; but they may, doubtless, be readily had with slightly inferior bearing surfaces or states of lubrication. Further, in many hundreds of comparative oil tests on a Thurston machine, each test lasting for one hour, with 3 1/2 in. x 7 in. journal and a total pressure on both bearings of 8,680 lbs., and a speed equivalent to 15 miles per hour with 33-in. wheel, with a temperature of bearings maintained at 100° F., and with 3 cu. cm. of mineral oil applied to the journal at the commencement of the test and no addition afterwards, with a narrow strip of cotton-damper lamp-wick let in to the lower bearing to act as a redistributor of oil and to catch the worn particles, we have obtained an average co-efficient of friction, for the hour, mostly ranging between 0.0050 and 0.0060, equivalent to about 1 to 1 1/4 lbs. per ton resistance. But then it must be

added that the journal is of hardened steel, which doubtless reduces the friction, and no care has been spared to make good bearing surfaces and to keep them in order. They do not, however, fit their journals as well as do good bearings in service. It is quite impossible to make any direct comparison of such tests with Mr. Wellington's results, but they certainly would offer some grounds for believing his figures to be too high.

Professor Thurston also presented a full discussion, dealing in the main with the more purely theoretical phases of the question, however, for which reason and on account of its length, we are compelled to omit it.

#### TECHNICAL.

##### Locomotive Building.

The Mason Machine Works in Taunton, Mass., have a few locomotives to build and a number of orders for their machinery on hand.

H. K. Porter & Co., in Pittsburgh, are building a number of very small engines for the Frick Coal & Coke Co. These engines are to be used for hauling the buggies used for charging the coke ovens. These little locomotives will take the place of the mules which have heretofore been used for that purpose.

##### The Car Shops.

The extensive works of the Wells & French Car & Bridge Co., in Chicago, were destroyed by fire on the evening of July 20, the main shop, the blacksmith shop, the paint shop, and several smaller buildings being burned, with 33 completed freight cars, 25 partly completed, and a very large stock of seasoned lumber and the machinery and materials. The loss is estimated at about \$150,000.

The Florida Southern shops, in Palatka, Fla., have just completed 2 passenger cars for the road.

The Barney & Smith Manufacturing Co., in Dayton, O., are building 100 box cars for the Cincinnati, Hamilton & Dayton. The cars are 34 ft. long and have a capacity of 20 tons each.

##### Iron and Steel.

The Swift Rolling Mill at Newport, Ky., has resumed work, giving employment to about 300 men.

The Union Rolling Mills of Carnegie Bros. & Co. in Pittsburgh, are at work upon a large order for iron beams to go to Milwaukee.

The Birmingham Rolling Mills, in Birmingham, Ala., are about to build a new mill for rolling iron plates.

The Clapp-Griffiths steel plant at Oliver Bros. & Phillips' mill, in Pittsburgh, is to be enlarged. The converter now in use is capable of turning out 100 tons per day when run to its full capacity.

##### Manufacturing and Business.

Messrs. H. Selling & Co., of the Metropolitan Restoring & Renovating Works, No. 254 Elizabeth street, New York, have a new process by which car seats can be cleaned and restored to their original color. The process, it is claimed, not only restores the color, but also removes the dirt, and does not in any way injure the fabric, the hair packing or springs of the seats. It can be applied without removing the upholstery or the seats. They have recently thus renovated the seats of a passenger car for the Pennsylvania Railroad and of two cars for the New York Central & Hudson River, and these tests have shown very satisfactory results.

##### Bridge Notes.

The contract for the foundations and substructure of the Baltimore & Ohio's new bridge over the Schuylkill in Philadelphia has been let to Wm. Sooy Smith & Son, who will begin work as soon as the location of the bridge is approved.

The contract for an iron highway bridge over the Cuivre River at Moscow, Mo., has been let to Raymond & Campbell, of Council Bluffs, Ia. The contract price is \$4,800.

##### The Rail Market.

**Steel Rails.**—The market is quiet with small lots selling at \$27@27.50 per ton at mill. Several large orders have been placed, the prices given including delivery, which, at current freight rates, would make the price \$26.50@27.

**Rail Fastenings.**—Demand continues light with quotations entirely nominal at 1.90 cents per lb. for spikes in Pittsburgh; 2.40@2.85 for track-bolts, and 1.60@1.70 for splice-bars.

**Old Rails.**—The market for old iron rails continues quiet, but holders are not inclined to shade prices. Sales are reported at \$17@17.50 per ton at sidewater. Old steel rails are quoted at \$16@17 in Pittsburgh.

##### Western Society of Engineers.

The 211th meeting was held in Chicago Tuesday, July 7. Mr. Cregier was called to the chair.

The resignation of Mr. J. F. Aldrich, as a member, was read and accepted.

The Secretary read a paper by Prof. J. A. L. Waddell, "An American Engineering Literature Society." The society then adjourned.

##### Brake Tests.

The special train sent out by the American Brake Co., of St. Louis, was given a series of tests July 17, on the Athol Branch of the Boston & Albany road near Indian Orchard, Mass. The tests were made on level track and on various grades, and were very successful. They were witnessed by Railroad Commissioner Stevens and by a number of officers of the Boston & Albany, the New York, New Haven & Hartford, the Boston & Maine, the New York & New England, the Providence & Worcester, and other New England roads.

##### Car Couplers in Michigan.

Mr. Wm. McPherson, Jr., Commissioner of Railroads of Michigan, has issued a circular in relation to the car coupler law recently passed by the Legislature of that state (published in another column), from which we take the following:

"From the provisions of the law it will be observed that it is requisite that the couplers selected by the Commissioner couple with each other, and also with the link and pin coupler now generally in use.

"For the purpose of testing couplers with reference to such requirements, as well as their efficiency, economy of construction, and strength, they must be full-sized working models fixed upon two or more freight cars, with attachments complete, as designed for actual use. Such cars will be sent to some convenient point, to be hereinafter designated, for practical test of the couplers, attached under such conditions as the Commissioner shall prescribe.

"No selections will be made upon the presentation of a detached model only. The qualities of the coupler must be clearly demonstrated by its actual working in position on the cars. But a model of your device, Patent Office size, would be acceptable to this department for our own information, and have a place in our collection of models, where it will have the attention of railroad officials and others interested in the subject.

"If practicable, 60 to 90 days' actual trial of a coupler upon the cars of some railroad company, with a certified statement of the officials of such company as to the results,

will be an important aid to the Commissioner in reaching a decision as to the merits of such device.

"Statements from competent and responsible superintendents, or mechanics, as to the cost of couplers and the expense of attaching the same to the cars, must accompany each device offered for test to the Commissioner.

"It is probable that the test contemplated by this circular will not be reached before October next; but ample notice will be given of the time and place, by circular from this office, and also through the railroad journals, so that all parties interested, and so desiring, may have an opportunity to be present."

##### A Durable Locomotive Fire-Box.

Mr. O. Stewart, Superintendent of Motive Power of the Fitchburg Railroad at Boston, is rebuilding a locomotive that has been in use for 27 years, and which during that long period of service used the same fire-box and flues. The fire-box taken out was not so dilapidated as many fire-boxes we have seen replaced after 3 years of service. The difference in durability is not due to the superior material of the old boiler and fire-box, but to the character of the water used. The pure soft water that flows uncontaminated over the granite and gneiss rocks of New England leaves no scale on fire-box sheets, and a multitude of disorders common to boilers using the lime-impregnated waters of many districts are avoided. Mr. Stewart enumerated quite a number of locomotives he has still running that are over 20 years old, and never have had the tubes taken out. He is making a new steel boiler for the engine he is rebuilding. There will not be much of the old engine left, for new cylinders and wheels form part of the repairs. In the course of repairs some driving axles were removed that had been running over 20 years. They were taken to the blacksmith shop and worked down into side rods, and the man doing the forging said he never worked more ductile iron. All the engines on this road are equipped with the Ashton blow-back valve, and Mr. Stewart says its presence has an astonishing educational effect upon engineers and firemen. There is no waste of steam through the safety valves on that road.—*National Car Builder.*

It is probable also that the fact that the waste steam from the blow-back valves being carried to the water tank tends to precipitate lime and other impurities, and thus improve the quality of the water before it is fed into the boiler. This would, perhaps, make comparatively little difference in districts where the water is pure; but where railroads are obliged to use impure water, it would undoubtedly increase the durability of boilers.

##### New Orleans Exposition Awards.

The S. A. Woods Machine Co. received at the New Orleans Exposition no less than 8 gold medals for its wood-working machinery, of different kinds, including flooring, molding, planing, matching, surfacing and joining machines, and circular saws.

##### An Excellent Furnace Record.

Mr. E. C. Potter, Superintendent of the North Chicago Rolling Mill Company, has sent us the following figures, giving the record of Furnaces 5, 6 and 7 during the month of June, viz., the quantity of iron made and the quantity of coke used:

	Iron produced, tons.	Coke used, tons.	Coke consumption, lbs. per ton.
No. 5.....	5,837	6,292	2,155
No. 6.....	5,810	6,188	2,139
No. 7.....	5,892	6,453	2,190
Total .....	17,539	18,933	2,156

The average daily product of those furnaces was: No. 5, 194 1/2 tons; No. 6, 194 tons; No. 7, 196 1/2 tons.—*Iron Age.*

##### A Solid Bridge.

It evidently pays to construct bridges in the most substantial manner. An ugly disaster on the Vandalia road was averted on Sunday last by the substantial character of the long railroad bridge over the Wabash River. As freight train No. 25 was crossing the structure a flange broke on one of the forward trucks in the train, and six cars were derailed and dragged for nearly the entire length of the bridge, the cars at one time scraping the iron side frame-work. The ties in the bridge in some places are nearly cut through, and show the fearful strain to which they were subjected.—*St. Louis Republican, July 17.*

##### The Use of the Locomotive Whistle.

The Massachusetts Railroad Commissioners have made their first recommendation, under the new law for the abatement of the nuisance of too much locomotive whistling, and, as the subject is of interest, the decision is given in full, as follows:

On the petition of H. F. Mills and others, of Lawrence, for the prevention or regulation of whistling by the locomotives of the Boston & Maine Railroad and the Boston & Lowell Railroad within 5,000 ft. from the intersection of the roads of said corporations with Parker street, a hearing was held at Lawrence, after due notice, on June 29.

Several citizens were heard in support of the petition, which was not opposed by the representatives of the two railroad corporations who were present; and nothing was said in opposition, except that a prominent citizen of North Andover very properly asked that no order should be passed which would prevent the warning signal being given at a dangerous crossing in that town near the Lawrence line. No such order has been passed, and that warning will continue to be given.

The petition was intended to cover two matters, (1) an order under chapter 334, of the acts of 1885, as to whistling at street crossings; (2) a recommendation under the general power of this board on such matters, in regard to whistling, as a railroad signal calling for switches and the like.

1. The act of this year was founded on the petition of various citizens, but it is in pursuance of a policy strongly advocated by our predecessors on this board. They have heretofore raised the question whether the use of the whistle as a danger signal has not done more harm than good, the accidents that it saves being, perhaps, overbalanced by the accidents which it causes by the frightening of horses and by the deaths resulting from the loss of sleep in cases of illness. They also suggest that the value of the whistle as a distinct signal of danger in an emergency has been greatly diminished by its free and almost indiscriminate use. It is to be observed also that the suffering and loss arising from the use of the whistle falls upon the innocent, while in other cases the penalty falls upon those who are negligent, or upon those who are occupying railroad tracks as a highway in violation of law. The Legislature has thought that while in unfrequented neighborhoods the use of the whistle at crossings is attended with little damage, and while at certain peculiarly dangerous places it may be necessary, yet at ordinary crossings in compact neighborhoods it may be forbidden with a balance of advantage to the public.

This has been well tested by experience. As long ago as 1875 the board say: "The Boston & Albany Co. has, at the request of the residents along its road, discontinued the use of the whistle, except a danger signal, for nearly two years, without experiencing any evil consequences. Those dwelling on the line of that road expressed themselves in the hearing as satisfied, and the number of accidents has not been in-



creased. Its officers also speak of the experiment, without the use of automatic signals, as an established success." The practice continues on this road with like good results; and a similar system prevails upon some other roads.

Railroad managers seem generally to concur in this view. They state that much of the whistling now practiced is not from actual necessity, but from a supposed legal exigency in order to avoid unjust lawsuits. The bill received attention from counsel representing several railroad companies, and was finally passed with the acquiescence of all.

The board have therefore granted the petition. And the formal orders required by law have been given to the corporations.

2. Upon the other matter of signals given by locomotive whistling from one employé to another, the board can pass no order. But we concur with the opinion strongly expressed by our predecessors on the commission that much of such whistling is needless, that it is an inexcusable annoyance to the public, an infringement on their rights, and in many cases an indictable nuisance. Therefore we strongly recommend to both the corporations to discontinue it in the territory covered by the petition. We have no doubt, from the experience of many railroad managers, that this can be done without unreasonable cost or trouble, and without hindrance to traffic. And the Commissioners are confident that both the corporations will willingly comply with this recommendation.

#### Iron Telegraph Poles.

The iron telegraph poles designed for the Suakim-Berber military telegraph were of somewhat novel design and unusually cheap and light, although on the same general plan as has been used for hundreds of miles of line in various parts of the world where timber is scarce. The peculiar feature is the use of a dwarf pile (also used quite extensively to carry signal and lamp posts, etc.) which is made of cast iron, slightly tapered for entering the ground, and again tapered off to receive the pole. It is hollow and driven forcibly into the ground by means of a wrought-iron rammer working inside of it, which strikes the blow just above the point of the pile, a little piece of old rope or a handful of earth serving as an effective cushion for the blows and preventing fracture.

One or two men can thus fix it in the ground in an average of less than five minutes. The pole, which is a taper tube, is attached in a most effective and simple manner by being slit at the bottom, which thus readily adjusts itself to the taper top of the piles; a wrought-iron ring driven over the slits securely fastens the whole. The economy and rapidity effected by the combination of these two simple appliances may be inferred by the fact that two men can now erect two miles of posts in a day, a task which upon the old system of excavation occupied no less than eight to ten men.

An important feature of the dwarf pile foundation is that the wire can be run along immediately the poles are erected, because the earth has not been disturbed and the pole is as rigid as it would be in twelve months under the excavating system. The whole weight of a dwarf pile and taper pole, the combined length of which is about 20 ft., is but 110 lbs.

#### THE SCRAP HEAP.

##### Secured His Rights.

An old negro called on the president of a railroad company. Hobbling into the room he said:

"Look at me, sah."  
"Well, what do you want?"  
"Money."  
"What for?"  
"Dis heah," holding out a foot from which three toes had been cut.

"I've got nothing to do with that."  
"Wall, er mighty fine lawyer tells me dat yer has. Waz on one o' yer trains tuden week when him jumped de track. De lawyer says dat I ken rekiver er thousan' dollars."

"Didn't you once work for the road?"  
"Yes, sah, I worked for it twicet."  
"Were you not riding on a free pass?"  
"No, sah; wuz ridin' on de train."  
"You know what I mean? Didn't you have a free pass?"  
"No, sah, I'll swar ter de Lawd I didn't, an' more den dat, I ken prube it."

"What do you propose to do about it?"  
"Perposes to hab my rights. Gin me \$10 an' a pass fur a year an' I'll let de thing drop."

The money and the pass were given him.  
"Thankee, sah." As he hobbled down the stairs he muttered: "Wan't ridin' on er free pass. Wuz er stealin' dat ride. Dis pass is jes' inter my han. Gwine ter fetch up fish frum de bayou. Huh, dis \$10 bill is ez putty as a new shirt."  
—Arkansas Traveler.

##### Train Wrecking by Dynamite.

A dispatch from Denver, Col., July 16, says: "As a passenger train was being made up in the yards of the Denver & Rio Grande Railroad this morning an empty chair car ran over a package of dynamite, which exploded with great force, wrecking the car and slightly injuring a switchman. It is believed that the dynamite was intended for the regular passenger train due to leave in a short time. The Denver & Rio Grande officials say they believe the work to be that of strikers."

##### An English Railroad Train.

The first impression which an American, who is experienced in railroad traveling in his own country, derives from the exterior aspect of an English train, is unfavorable. The cars, as he must necessarily call them, seem to be small; they lack, apparently, the weight and solidity of the American passenger-coach; the compartments are narrow, the ceilings low, the ventilation apparently doubtful. They stand upon two, three, or more pairs of gaunt high wheels, to the axles of which their springs are directly geared. He misses the little, independent vehicle, the truck, or bogie, with its four or six small, compact, solid-looking, wide-flanged wheels, which sustains each end of the American car—that rolling gear which looks so strong, so adapted to inequality of rail or curve, so resourceful against disaster, and so complete in its equipment. The cars are smaller—there is no doubt of it. They are narrower and they are shorter; and to the American eye they look even shorter than they really are, because they have no projecting platform at the ends, no overhanging roof or hood, but are buckled close up to each other, and their contact controlled by small metal buffers, the springs of which allow a play of from eighteen inches to two feet and a half between car and car. The Miller platform, the Janney coupler, the link and pin—of all the familiar devices of the United States there is not one to be seen. The brakes? None visible. Nor, for the matter of that, a brakeman. This influential and numerous person has no existence in England. There is not even a rudimentary type of him. That you do not find him is the first stern intimation you receive that in English railroading there are no autocrats. The wheels are fitted with brakes, however, and the trained eye notes a rubber hose connection between the carriages, quite different in its application to that known at home, but which nevertheless betokens the air-brake. He takes account of the distinctions of class, and reflects upon his country's

veiled progress in that regard in the matter of parlor cars and limited express-trains. Then he finds that there is no baggage-master to wait the volatile Saratoga to its doom, as his own newspapers would express it. There is perhaps a luggage van or two, or there are in the carriages themselves luggage compartments according to the way in which the train is made up, the length of the journey it is to take, or the custom of the particular line under observation. His final contemplation is perhaps devoted to the engine, and if he has ever given any of his attention to the American locomotive, it fills him with a deep concern. He recalls the imposing splendor of the latter, its comfortable and lofty cab of oiled and polished wood, its gay brass bell, the soul-stirring whistle, the noble head-light and the cow-destroying pilot, the great cinder-consuming smoke-stack (unless it be a hard coal burner, in which case that feature shrinks to moderate proportions), the powerful drivers and compact cylinders, the eccentric connecting rods, and all its parts radiant with the glitter of polished steel or burnished brass, or decked with appropriate vermilion or emerald green. In all of these matters the English locomotive compares with it much as a lawn-mower does with a New York fire-engine. It is a humble, awkward green or monochromatic machine. It has neither polish nor decoration about it. There is no cab. The engineer and his fireman—that is to say, the engineer-driver and his stoker, as they are styled in England—perform their duties with only such shelter as is afforded by a board screen in front of them, pierced by two round apertures filled with stout glass, technically known as "spectacles." The smokestack is short and thick; there is an unsightly green hump on the back of the boiler; the cylinders are under the front of the latter instead of on each side before the drivers; the wheels are all large, and the body of the engine is perched high above them, and looks top-heavy and dangerous. The whole thing is rigid and stiff-looking, and to the observer who has had to do with the external aspects of locomotives it is unprepossessing and unlovely. The practical American engineer whistles thoughtfully as he surveys it, and wonders to himself how long it would be before he would ditch his train if he had to run on a new Western railroad with such an engine. Where would he be on a sharp curve, or how would such running gear adapt itself to an unevenly ballasted track? The low centre of gravity of the American locomotive, the weight distributed well down between the wheels, the play of the small broad flanges under the pilot truck, and the external gearing of the driving wheels, all give the American engine an appearance of stability which impresses not merely the layman, but also the expert.—Harper's Magazine for August.

#### A Rule Which Works Both Ways.

On the Athens Branch of the Georgia Railroad last Saturday night there was an exercise of the right of the railroad to set apart separate accommodations for its white and colored passengers which will hardly receive the attention generally bestowed on such discriminations by the professional "outrage" organs.

The first-class coach was divided into two compartments of equal size and exactly alike in every particular. The rear one of these compartments was crowded, and two gentlemen who could not obtain seats in it went to the forward portion of the car, where there were half a dozen negroes seated, and found plenty of vacant seats. They settled on one of these and were quietly conversing when the conductor came through. Tapping one of the gentlemen on the shoulder, he said:

"I will have to trouble you to move, gentlemen; you cannot sit in this car."  
"Why not?"  
"Because it is set apart for colored passengers, and no white person is allowed to sit in here any more than a negro is permitted to sit in the other end of the car."  
"But we can't get a seat in there."  
"There is a smoking car in front where you will find seats. It is against the rules for you to stay here."

The gentlemen took in the situation at once, and moved forward. One was a prominent Georgia merchant, and the other a well-known editor. Both agreed that there was more practical statesmanship in the construction and management of that passenger coach than in all the civil rights legislation that was ever attempted.—Atlanta (Ga.) Constitution, July 17.

#### Attempt at Train Wrecking.

A dispatch from Troy, N. Y., July 9, says: "A trackman this morning discovered a box, about 20 in. long and 4 in. wide, on the bridge over the Salmon River, 4 miles south of Plattsburg. A string leading from one end of the box was attached to a loose piece of timber lying on the railroad track, and this, when struck by a locomotive, would have fallen and caused the box to explode. The early sleeper, which was due a few minutes after the time the box was discovered, was flagged. The box was taken to Plattsburg, and upon being opened was found to contain a cartridge of giant powder 1½ in. in diameter, and a pistol, the trigger of which was attached to the string which led to the timber. There is no doubt that it was a deliberate attempt to blow up the train and the bridge. There are no clues to the perpetrators of the dastardly act."

#### A Veteran Conductor.

Among the hale and hearty and to all appearances young men employed by the Chicago & Northwestern road, is Mr. James Knight, a passenger conductor on the Milwaukee Division of this line. Mr. Knight is nevertheless a veteran in service, for on July 3, 1885, he celebrated the thirty-third anniversary of his entering the railway service. He estimates that during that long period he has traveled no less than 100 miles a day. Mr. Knight enjoys his distinction, and does not object to telling his many varied and interesting experiences, one of the features that make him as popular as he is.—Chicago Inter-Ocean, July 19.

#### A Pass Swindler.

An unsuccessful effort was made yesterday to work the Omaha and Milwaukee & St. Paul roads for passes from St. Paul to Chicago. During the forenoon a handsomely dressed lady, 25 or 27 years of age, presented an application to the two companies for a pass for A. Powers and wife. The requests were written on letter-heads of the Central Vermont, and bore the stamp of the Superintendent of that road. E. F. Brooks is Superintendent of that company, but over his name was printed that of C. Morgan, with a rubber stamp. The requests were signed by Morgan. The Omaha officials filed the request and told the lady to call again. Subsequently a telegram was sent to Superintendent Brooks, at Brattleboro, Vt. He responded by wire, and said he knew nothing of either Morgan or Powers, and that the latter was evidently a fraud. The lady presenting the pass represented herself as Powers' wife. Judge Chandler, of the Milwaukee & St. Paul, also refused the request, as it is not the custom of any of the Northwestern roads to grant such requests unless the persons presenting them are fully identified.—St. Paul Pioneer-Press, July 16.

#### Discrimination Against Newspapers.

The Kansas Railroad Commissioners have addressed a letter similar to the following to the managers of every railroad in the state:

"We are in receipt of a communication from the Governor

inclosing a complaint by the Commonwealth Co., supported by the publishers of the daily papers of the state, alleging that they are discriminated against by the newsdealers who have charge of the sale of daily papers upon the trains operated by your company, in that they refuse to offer for sale the daily papers published at Topeka and other cities of the state, to the great detriment of the business interests of said publishers and the inconvenience of the traveling public who may desire to purchase such publications. Will you kindly inform the board of the nature of the agreement that exists between your company and the newsdealers who operate upon the trains of your road, and will you lend your assistance in securing to our state publications the means of that fair competition which justice demands and the enterprise of the publishers so worthily deserve."

## General Railroad News.

### MEETINGS AND ANNOUNCEMENTS.

#### Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atlanta & West Point, annual meeting, in Atlanta, Ga., July 25.  
St. Paul, Minneapolis & Manitoba, annual meeting, at the office in St. Paul, Minn., Aug. 20.  
Terre Haute & Indianapolis, special meeting in Terre Haute, Ind., Aug. 16.

#### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Columbus, Hocking Valley & Toledo, 13½ per cent. in new stock, payable Aug. 19.  
Pacific Mail Steamship Co., 1¼ per cent., quarterly, payable Aug. 1, to stockholders of record on July 23.  
Pullman's Palace Car Co., 2 per cent., quarterly, payable Aug. 15, to stockholders of record on Aug. 1.  
St. Louis & San Francisco, 3½ per cent., semi-annual, on the first-preferred stock, payable Aug. 10, to stockholders of record on July 25.

#### Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The Master Car-Painters' Association will hold its annual convention in Toronto, Ont., on Wednesday, Sept. 2.  
The National Association of General Passenger & Ticket Agents will hold its next half-yearly meeting in New York, at 11 a. m., on Tuesday, Sept. 15.  
The Brotherhood of Locomotive Firemen will hold its annual convention in Philadelphia, on Monday, Sept. 21.  
The General Time Convention will meet at the Grand Pacific Hotel in Chicago, on Thursday, Oct. 8.  
The Southern Time Convention will meet at the National Railway Exchange, No. 46 Bond street, New York, on Wednesday, Oct. 14.

#### General Baggage Agents' Association.

The semi-annual meeting of the Association of General Baggage Agents was held in Minneapolis, July 17. The usual routine business was transacted and a special discussion was held on the question of the transportation of dead bodies. The committee on that question reported that considerable embarrassment had often resulted from the operation of local ordinances and state laws, and that the transportation of bodies of persons who had died of contagious diseases might give rise to much trouble; the committee had been in correspondence with the boards of health of several states and had found much difference in the regulations adopted by them. In conclusion they recommended the adoption of an air-tight rubber package to be used in all cases where bodies were forwarded by rail, this package being recommended by the boards of health of the several states and by a large number of physicians.

It was resolved to hold the next half-yearly meeting in Cincinnati on the third Wednesday in January. The meeting closed with an excursion to Lake Minnetonka.

#### Brotherhood of Locomotive Engineers.

Four hundred members of the Massachusetts Brotherhood of Locomotive Engineers enjoyed the annual excursion, July 19. The trip was by the Fitchburg Railroad from Boston to North Adams, where a banquet was served at the Wilson House. After the dinner, Mr. C. E. Dean, of the Boston & Albany, with a few well-chosen remarks, offered the following resolutions, which were unanimously adopted:

"Whereas, During the past two years one of our number has served on the Railroad Commission of the Commonwealth; and, whereas, the term of office to which he was appointed expires before our next annual gathering, and the railway employes of the State desire a continued representation on the said commission:

"Resolved, That we, the Brotherhood of Locomotive Engineers, appreciating the faithful, efficient and intelligent service of Brother Everett A. Stevens, earnestly express and desire that his term of office be extended by a second appointment to the said commission.

"Resolved, That these resolutions be recorded, and a copy of the same, duly attested by the Executive Committee, be transmitted to his Excellency the Governor, Brother Stevens and the press."

Following the adoption of the resolutions, remarks were made by Mr. E. Carrigan and Mr. George Richards, Master Mechanic of the Boston & Providence Railroad, and those having charge of the excursion were warmly congratulated on the success which had attended their efforts.

### ELECTIONS AND APPOINTMENTS.

Belfast & Moosehead Lake.—This company, whose road is leased to the Maine Central, has elected I. M. Boardman, President; John H. Quimby, Clerk and Treasurer.

Bloomfield.—Mr. P. H. Blue has been appointed General Superintendent, with office at Sullivan, Ind. He was recently Receiver of the road.

Chicago, St. Louis & Missouri River Association.—Mr. Edward P. Wilson has been chosen Arbitrator in place of J. H. Hiland, resigned. Mr. Wilson was recently General Passenger Agent of the Cincinnati, New Orleans & Texas Pacific lines.

Decorah, Rochester & Red River.—The officers of this new company are: President, Wm. H. Valleur, Decorah, Ia.; Vice-President, Hiram T. Horton, Rochester, Minn.; Secretary, George W. Adams, Decorah, Ia.

Houston & Texas Central.—Mr. George A. Quinlan, late Division Superintendent, has been appointed General Superintendent in place of Mr. J. Waldo, now Agent for the Receivers and General Manager. Mr. M. Allen is appointed Superintendent of the Waco Branch. Mr. L. A. Daffin is appointed Train-master of the Northern Division and A. W. Littig Trainmaster of the Southern Division.

Lockport & Buffalo.—This company, whose road is leased to the New York, Lake Erie & Western, has elected direc-



tors as follows: Thomas T. Flagler, Joseph A. Ward, James Jackson, Jr., Benj. Carpenter, Louis S. Payne, Elisha Moody, J. Carl Jackson, L. F. Bowen, John H. Buck, James O. King, Isaac H. Babcock, Wm. McRae and Alonzo J. Mansfield.

**Mineral Range.**—At the regular meeting of the board of directors held in Hancock, Mich., July 14, the following officers were elected: George H. Stayner, President; Henry S. Ives, Vice-President, Secretary and Treasurer, with fiscal agency in the city of New York. Mr. C. A. Wright has been appointed General Manager, with office at Hancock, Mich. Mr. W. H. Carr has been appointed General Freight and Passenger Agent.

**Minnesota & Northwestern.**—Mr. Joel May has been appointed Trainmaster, with office in St. Paul, Minn. All dispatchers and trainmen will report to him.

**Quincy, Missouri & Pacific.**—When this road is transferred to the trustees on Aug. 1, Mr. Amos Green, of Quincy, Ill., will take charge as Managing Agent for the trustees. Mr. Frank D. Schermerhorn will be Superintendent and General Freight Agent.

**Rome.**—At the annual meeting in Rome, Ga., July 15, Dr. Eben Hillyer was re-elected President, with the old board of directors.

**St. Louis & Cairo.**—Mr. E. J. Newell has been appointed Master Mechanic of this road.

**Schuylkill & Middleton Canal.**—This company, successor to the Union Canal Co., of Pennsylvania, has elected officers as follows: President, Grant Weidman; Directors, George de B. Keim, Albert Foster, A. H. O'Brien, C. H. Quarles, William S. Hassall and A. Reeder Chambers.

**Texas & St. Louis.**—Mr. L. J. Kraemer having resigned as General Baggage Agent, Mr. J. B. Wadleigh, Commercial Agent at Texarkana, will temporarily have charge of all matters pertaining to the baggage department.

**Troy & Boston.**—Mr. J. H. Parsons has been elected Vice-President of this company, in place of Mr. S. B. Sanford, resigned.

### PERSONAL.

—Mr. J. H. Hiland has resigned his position as arbitrator of the Chicago, St. Louis & Missouri River Association, and will take charge as manager of the business of the Minneapolis Millers' Association, which includes extensive dealings with the railroad companies. In this position, Mr. Hiland's long railroad experience will be of much benefit to him.

—Mr. W. W. Clayton, who died in Atlanta, Ga., July 20, aged 74 years, was for many years a well-known citizen of that city. He was a popular man, and was highly respected for his integrity. He held many offices of trust. For several years he was Treasurer of the Western & Atlantic road under the state management, and was afterward General Agent of the Georgia Railroad.

—Mr. Coe F. Young has tendered his resignation as Vice-President of the Delaware & Hudson Canal Co., to take effect as soon as his successor is chosen. Mr. Young has been with the company for 21 years, serving as Assistant Superintendent and Superintendent of the canal, General Superintendent of the company's railroads, General Manager and Vice-President. He retires from its service for personal reasons entirely.

—Mr. Edwin C. Litchfield, a very well-known and wealthy citizen of Brooklyn, died July 20, at Aix-les-Bains, France, in the 71st year of his age. He was a native of Delhi, N. Y. After graduation from Hamilton College, he studied law in the office of Judge Edmunds, at Hudson, N. Y., and was admitted to the bar. He practiced his profession in New York and Brooklyn, being, while in New York, a partner of the late Charles Tracy. Becoming interested in railroad operations, he was very actively connected with the construction of the Michigan Southern & Northern Indiana Railroad. Mr. Litchfield invested in real estate a large part of the wealth which he derived from his railroad and other enterprises. At the time of his death he was probably the largest holder of real estate in Brooklyn, and he was also the owner of very extensive lands in Iowa. Mr. Litchfield was very fond of pictures and statuary, particularly the latter, of which he had one of the finest collections in this country. Three years ago he went to Europe for the benefit of his health, and he has lived abroad ever since.

### TRAFFIC AND EARNINGS.

#### Coal.

Coal tonnages for the week ending July 11 are reported as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Anthracite.....	710,848	945,656	D. 234,808	24.8
Eastern bituminous.....	182,076	176,226	I. 5,850	3.3
Coke.....	50,865	57,137	D. 6,272	10.8

It is reported that some of the anthracite companies desire to limit production below the present allotment for a month or two, believing that the tonnage authorized by the present agreement is more than the market will stand. Nothing has been done openly as yet toward such an arrangement, and it is doubtful whether all the companies could be brought to agree to it.

Anthracite coal tonnages for June and the six months to June 30 are given by Mr. John H. Jones, the Official Accountant, as below, the statement including the entire production of anthracite coal, excepting that consumed by employees and for steam and heating purposes about the mines:

	1885.	1884.	1885.	1884.
Phila. & Reading.....	935,447	768,689	4,727,793	4,707,532
Lehigh Valley.....	470,918	386,044	2,355,556	2,590,643
Del. & Lack. & West.....	392,572	342,450	1,927,877	2,239,088
Del. & Hudson Canal Co.....	235,416	206,611	1,310,967	1,422,550
Pennsylvania R. R. Co.....	282,852	276,919	1,550,506	1,444,430
Coal Co. 106,787.....		82,998	568,821	590,138
N. Y., L. E. & W.....	46,040	34,459	259,802	164,872

Total.....2,490,032 2,629,179 12,701,322 13,150,253

Increase for the month, 460,853 tons, or 22.7 per cent.; decrease for the six months, 457,931 tons, or 3.5 per cent.

The division of the tonnage compares with last year as follows:

	Allotment.	1885.	1884.
Philadelphia & Reading.....	38.85	37.2	35.8
Lehigh Valley.....	19.60	18.6	19.7
Delaware, Lackawanna & Western.....	16.05	15.2	17.0
Delaware & Hudson Canal Co.....	11.00	10.3	10.3
Pennsylvania Railroad Co.....	8.40	12.2	11.0
Pennsylvania Coal Co.....	5.00	4.5	4.5
New York, Lake Erie & Western.....	1.50	2.0	1.2

Total.....100.00 100.0 100.0

The Pennsylvania Railroad Co. is not a party to the agreement.

The stock of coal on hand at tidewater shipping points, June 30, 1885, was 582,163 tons; on May 31, 1885, 525,641

tons; increase, 56,522 tons, or 10.7 per cent., during the month.

Mr. Charles A. Ashburner, Geologist in charge of the survey of the anthracite coal region, has submitted to the Pennsylvania State Geologist a report on the production for 1883 and 1884, giving the output of all the collieries and many other interesting facts. His statement of production of 1884, giving also the area of the several coal fields in square miles, is as follows:

	Area.	Production.	Tons.	Per ct.
Northern field.....	269	16,411,277	50.3	
Eastern Middle field.....	40	5,098,684	15.6	
Western Middle field.....	90	7,896,049	24.2	
Southern field.....	140	3,149,471	9.6	
Loyalsock field.....		80,018	0.3	

Total.....470 32,641,499 100.0

The area of the Loyalsock field is not yet determined.

Mr. Ashburner estimates the total production of anthracite from 1820 up to the end of 1884 at 575,931,025 tons. This includes the consumption at collieries and by miners, as well as the coal shipped.

### Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Char., Col. & A.....	\$379,024	\$357,895	I. \$21,129	5.9
Col. & Greenville.....	317,788	298,854	I. 18,934	6.3
Des M. & Ft. D.....	169,277	155,989	I. 13,288	8.8
Georgia Pacific.....	304,222	260,222	I. 44,000	16.9
Marq., H. & O.....	285,195	344,387	D. 59,192	17.2
Mexican National.....	814,900	833,549	D. 18,649	2.2
Nash., C. & St. L.....	1,027,218	1,145,181	D. 117,963	10.3
Net earnings.....	352,052	491,099	D. 139,047	28.3
N. Y., Ont. & W.....	820,357	845,535	D. 25,178	2.9
Ohio Southern.....	201,775	205,872	D. 4,097	1.9
Rich. & Dan.....	1,855,573	1,825,102	I. 30,471	1.7
South Carolina.....	532,993	577,340	D. 44,347	7.7
Texas & St. L.....	438,330	363,607	I. 74,723	20.5
Tol., Ann Arbor.....		104,808	I. 19,291	18.4
& N. M.....	124,099	732,705	D. 40,547	5.5
Va. Midland.....	69,158	100,936	I. 11,900	5.8
Western N. C.....	202,026			

Five months to May 31:

N. Y., Penna. & Ohio.....	\$1,932,714	\$2,223,587	D. \$290,873	13.8
Rome, W. & O.....	608,795	589,458	I. 19,337	3.3

Month of May:

Rome, Wat. & O.....	\$133,645	\$133,882	D. \$237	0.2
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So. Pac.—Pacific System..... 1,682,635 |  |  |  |

Net earnings..... 867,681 |  |  |  |

Month of June:

Char., Col. & A.....	\$42,745	\$38,299	I. \$4,446	11.7
Col. & Greenville.....	30,974	27,148	I. 3,826	10.1
Des M. & Ft. D.....	27,318	27,735	I. 417	1.5
Georgia Pacific.....	38,610	40,221	D. 1,611	4.2
Marq., H. & O.....	124,965	144,700	D. 19,735	15.8
Mexican National.....	138,267	119,853	I. 18,414	13.3
Nash., C. & St. L.....	147,700	161,957	D. 14,257	9.6
Net earnings.....	61,903	79,689	D. 17,786	28.7
N. Y., Ont. & W.....	153,142	167,912	D. 14,770	9.6
Ohio Southern.....	26,876	27,392	D. 516	1.8
Rich. & Dan.....	266,294	251,819	I. 14,475	5.7
So. Carolina.....	50,523	55,774	D. 5,251	9.4
Texas & St. L.....	69,045	65,513	I. 3,532	5.4
Tol., Ann Arbor.....		20,317	D. 819	4.0
& N. M.....	119,993	128,433	D. 8,440	7.4
Va. Midland.....	25,787	29,629	D. 3,842	13.0
Western N. C.....				

Second week in July:

Boston, Hoosac.....		\$9,423	I. \$261	2.8
Tun & W.....	\$9,684	41,684	I. 11,605	27.6
Bur., C. R. & No.....	53,289	153,000	I. 55,000	34.6
Canadian Pacific.....	206,000	182,959	D. 17,031	9.3
Chicago & Alton.....	165,928	30,257	D. 4,900	16.2
Chi. & East. Ill.....	25,357	428,294	D. 12,294	2.9
Chi. Mil. & St. P.....	416,000			
Chi. & Northwest.....				
Chi., St. P., Min. & Omaha.....	185,700	173,900	I. 11,800	6.8
Cin., Ind., St. L. & Chi.....	38,379	44,563	D. 6,184	13.7
Det., Lan. & No.....	19,651	20,513	D. 862	3.2
Illinois Central.....	191,800	178,602	I. 13,198	7.4
Iowa lines.....	32,100	31,936	I. 164	0.5
Mil. & Northern.....	10,686	9,347	I. 1,339	14.4
Peoria, Dec. & E.....	11,595	11,058	I. 537	4.9
Roch. & Pitts.....	25,665	24,826	I. 839	3.4
St. L. & San F.....	64,400	81,500	D. 17,100	20.9

Weekly earnings are usually estimated in part, and are subject to correction by later statements. The same remark applies to early statements of monthly earnings.

### Cotton.

Cotton movement for the week ending July 17 is reported as follows, in bales:

	1885.	1884.	Inc. or Dec.	P. c.
Interior markets:				
Receipts.....	1,477	3,330	D. 1,853	56.1
Shipments.....	6,597	7,027	D. 430	6.1
Stock, July 17.....	23,501	28,244	D. 4,743	16.6
Seaports:				
Receipts.....	1,972	3,810	D. 1,838	48.4
Exports.....	18,004	22,919	D. 4,915	18.8
Stock, July 17.....	239,374	253,622	D. 14,248	5.6

The total shipments from plantations for the cotton year (from Sept. 1) to July 17 are estimated at 5,592,073 bales, against 5,643,377 to the same date last year, 6,928,648 in 1882-83, and 5,328,398 in 1881-82.

### Colorado & California Association.

A dispatch from Chicago, July 22, says: "Representatives of lines belonging to the Colorado Railway Association held a meeting to-day and took the first steps in the formation of a new pool. It was agreed to form an association pooling all business between Colorado and California, and covering all revenues between Ogden, Deming and Albuquerque on the west, and Colorado on the east, to be called the Colorado & California Railway Association. The lines interested in the new pool will include the Union Pacific, the Denver & Rio Grande and the Atchison, Topeka & Santa Fe."

### San Francisco Wheat Exports.

San Francisco exports for the California crop year, which ends June 30, were as follows—flour in barrels and wheat in bushels, flour being reduced to wheat in the totals:

	1884-85.	1883-84.	1882-83.
Flour.....	1,308,304	1,257,001	1,099,651
Wheat.....	26,855,767	18,936,830	24,336,327

Total, bushels.....33,397,287 25,121,835 29,834,582

The total increase over the preceding year was 8,275,452 bushels, or 32.9 per cent.; over 1882-83 the increase was 3,592,705 bushels, or 11.9 per cent.

### California Through Freights.

Shipments of through freights eastward from California points in May were:

	Tons.	Per ct.
Northern Route (Central Pacific).....	8,248	37.1
Southern Route.....	6,197	42.9

Total.....14,445 100.0

Leading items of freight were 3,020 tons sugar, 2,247 tons wool, 999 tons wine and 2,868 tons oranges.

### Northwestern Traffic Association.

A meeting of the Northwestern Traffic Association was held in Milwaukee last week, the object being to equalize rates by the Washburn Route from Lake Superior points with those by the other lines. There was a long discussion, but no conclusion was reached, and the whole matter was referred to arbitration.

After another long discussion, an agreement was made to make rates on coal from Lake Superior ports to points in Iowa, Minnesota, and Dakota the same as from Chicago.

### Chicago, St. Louis & Missouri River Association.

At a meeting of the Chicago, St. Louis & Missouri River Passenger Association in Chicago, last week, a good deal of routine business was disposed of, and Mr. E. P. Wilson was chosen arbitrator of the Association, in place of J. H. Hiland, resigned. Mr. Wilson recently resigned the position of General Passenger Agent of the Cincinnati, New Orleans & Texas Pacific road, and has had long experience in passenger business in the South and Southwest.

### The Texas Pool.

The representatives of the lines which have agreed to form the new Texas pool met in Galveston, July 16, their session continuing nearly a week. The Missouri Pacific, the Southern Pacific, the Gulf, Colorado & Santa Fe, the Texas & New Orleans and the Houston & Texas Central were all represented. The agreement concluded in New York provided only for the formation of a pool, leaving the details to be adjusted at the present meeting. An extended discussion was had over the plan of division of the earnings to be adopted, and finally it is understood that an agreement was reached under which all business, local and through, will be put into a single pool, and the division for the first year will be made on the basis of the gross earnings of the respective roads of 1883.

A Galveston dispatch of July 22 says that the conference is still in session. Chairman Sealy states that nothing really definite has yet been agreed upon, but that the conference is making fair progress. Many perplexing details are occupying its attention. No percentages have yet been agreed upon or directly considered by the conference, it being impossible to reach the actual percentages of the pool until all questions bearing on the same are adjusted. This, however, does not necessarily indicate that a satisfactory arrangement will not be reached within a few days. The question of paying commissions to ticket agents has been discussed frequently, and it is said that the conference has adopted a rule prohibiting such payments.

### Colorado-Utah Association.

A meeting of the Colorado-Utah Association was held in Chicago, July 21, for the purpose of reorganizing the pool. This was made necessary by the withdrawal of the Chicago, Milwaukee & St. Paul. After a good deal of discussion, in which it was stated that the Milwaukee & St. Paul would not reenter the Association unless there be an entirely new division, it was resolved to extend the present agreement until Oct. 1 next.

### Trunk Line Meeting.

The meeting of the trunk line presidents in New York, July 21, resulted in no action upon any point. After a brief discussion of the situation, it was resolved to adjourn for one week.

### RAILROAD LAW.

#### The Michigan Car Coupler Law.

The following is the full text of the law passed by the Michigan Legislature last month in relation to automatic car couplers:

"An act to provide for the introduction and use on all cars owned and operated by any railroad company or other corporation doing business in this state, of some form of automatic car coupling, by means of which all cars may be coupled and uncoupled without the necessity of the brakeman or other person passing between the cars.

"SEC. 1. The People of the state of Michigan enact, that every railroad company on and after the first day of July, 1886, owning or operating a railroad or any portion of a railroad, wholly or partly in this state, shall place or cause to be placed, upon every freight car thereafter constructed, purchased or leased by such corporation, and upon every freight car owned or leased by such corporation which is used for the shop for general repairs, or for repair of the coupling fixtures thereof, with the intent to use such car, such form of automatic or other safety coupler, at each end thereof, as the Commissioner of Railroads after examination and test of the same may prescribe. And such Commissioner of Railroads, on or before May 1, 1886, shall select two or more different patterns of automatic or safety couplers which will couple with each other, and also with the link and pin coupler now generally in use, from which patterns said railroad companies may select couplers for use on cars, as required by this act.

"SEC. 2. The provisions of this act may be enforced by any Circuit Court of this state in a county through which the railroad of any company refusing to comply with such provisions may run, upon application of the Commissioner of Railroads, under such penalty as the said Court may determine, of not less than \$100 for each violation of the provisions of this act."

### OLD AND NEW ROADS.

**Anniston & Atlantic.**—A survey is being made for the extension of this road to Montgomery, Ala.

**Atchison, Topeka & Santa Fe.**—This company's southern Kansas line is now completed and opened for business to Crisfield, Kan., 7 miles southwest of the late terminus at Attica and 323 miles from Kansas City.

**Bloomfield.**—In the United States Court of Sullivan County, Ind., July 14, an order was made by which the Receiver of this road was discharged and the road restored to the company, on condition that the company accepts and provides for the debts of the Receiver. An order was also made enjoining all persons, and especially the Indiana & Illinois Southern Co., from interfering with the Bloomfield Railroad Co. in its possession of the property. The road extends from Switz City, Ind., westward to Merom, on the Wabash River, 31 miles, and was formerly operated in connection with Indiana & Illinois Southern road in Illinois, but for some time past has been in possession of a Receiver. It is understood that the bondholders have agreed to advance sufficient money to pay off the current debts and to change the road from 8 ft. to standard gauge.

**Blue Springs, Orange City & Atlantic.**—Work has been begun on the grading of this road, which is to extend from Blue Springs, Fla., through Orange City to New Smyrna, on Hillsboro River, near Mosquito Inlet. The road will be about 30 miles long.

**Bradford, Eldred & Cuba.**—The operation of this road was suspended last year soon after the first snow spell, the business not being sufficient to warrant the expenditure



for the running of trains. The oil operations having been resumed, however, on the line of the road, it has been decided to put it in operation again, and repairs are now in progress.

**Central Massachusetts.**—The Boston *Advertiser* says: "The contract has been closed between the Central Massachusetts and the Boston & Lowell Railroad companies, and its terms are substantially as follows: The Boston & Lowell is to repair and operate the Central Massachusetts as its agents. There is no definite term. They can terminate the arrangement on three months' notice and the Central can terminate it on six months' notice. For the road, as it now stands, the Boston & Lowell is to pay no rent, but they are to pay 5 per cent. on any improvements that they make, not exceeding \$200,000. The trustees of the Central will issue certificates of indebtedness as fast as the improvements are made. Whenever the contract is terminated, the Boston & Lowell is to be reimbursed for its expenditures, and the certificates are to be given up. These certificates will have by law the first lien on those portions of the road where the money is expended, which, practically, will doubtless be the whole road. The Boston & Lowell will immediately proceed to put the road in order, and will begin to operate it as soon as it is ready, which will probably be in two or three weeks."

**Central of New Jersey.**—A meeting of the board was held in New York July 21, to consider a proposition submitted by the Baltimore & Ohio for a traffic contract which shall give that company the use of the Central tracks and terminal facilities in New York. The proposed contract was discussed, but was not finally acted upon, the board considering it best to postpone any final agreement until after the trial of the company's application to recover its road from the lessee.

**Chesapeake & Nashville.**—A contract has been let to J. C. Rodemeyer & Co., of Gallatin, Tenn., for the grading, masonry and trestle work of this road, from Gallatin northeast to Scottsville, Ky., about 35 miles. They are to begin work at once.

**Chesapeake & Ohio.**—Officials of this company say, regarding the claim of the state of West Virginia for \$212,000 back taxes and interest, that the matter is still in litigation. In consideration of building the road across the state, the road was exempted from taxation, which the state now repudiates. Appeal has been made, and at this stage decision is against the railroad company on a technicality. When the matter is settled by the courts, the amount found to be due, if any, will be paid.

**Chicago & Atlantic.**—Judge Wallace, of the United States Circuit Court in New York, has denied the motion to remand the suits between this company and the New York, Lake Erie & Western, and the New York, Pennsylvania & Ohio, to the state court, and they will accordingly remain in the Federal court.

**Chicago & Evanston.**—At a conference held last week between the officers of this road and of the Chicago & Northwestern, an understanding was reached with regard to the crossing of the Northwestern tracks by the new road near Canal and Fulton streets in Chicago, and an arrangement has been concluded by which the Chicago & Evanston trains will run over the Northwestern track to the Union Depot on Canal street as soon as the necessary connections can be put in.

**Chicago & Northwestern.**—Mr. M. L. Sykes, Treasurer of this company, states that bonds maturing Aug. 1, 1885, consisting of the preferred sinking fund bonds, Appleton extension bonds and Green Bay extension bonds, will be prepaid in full, with interest up to Aug. 1, 1885, without rebate, upon surrender of bonds and coupons. Registered bonds must be transferred on company's books to bearer. Interest on the above-named issues will cease Aug. 1 next.

**Cleveland, Wooster & Southern.**—A survey has been begun on the line of this projected road from Cleveland O., through Millersburg, to Coshocton.

**Darien Short Line.**—This company has been organized to build a railroad from the port of Darien, Ga., northeast to Walthourville, on the Savannah, Florida & Western road, a distance of about 30 miles. A further extension to Reidsville, 35 miles, is also proposed. The company is now trying to raise \$300 to have a preliminary survey made of the line, and if it succeeds in securing that large amount there is some prospect that something will be done.

**Decorah, Rochester & Red River.**—This company has been incorporated to build a railroad from Decorah, Ia., northward to Rochester, Minn., and thence to St. Paul and Minneapolis. It is said to be intended as an extension of the Burlington, Cedar Rapids & Northern's branch to Decorah.

**Denver & Rio Grande.**—Upon petition of George Coppel, Chairman of the New York committee of the consolidated mortgage bondholders, Judge Hallett, in the United States Circuit Court, in Denver, July 22, ordered that payments upon the principal of the car trusts be suspended until October next, when a final hearing will be had. The Court also directed the Receiver to pay the coupons of the first-mortgage bonds maturing last November. Receiver Jackson will therefore arrange for their payment in New York next week.

**East Tennessee, Virginia & Georgia.**—A dispatch from Knoxville, Tenn., July 18, says: "Attorneys representing the several interests have agreed upon a compromise in the case of the Central Trust Co. of New York, holding bonds of the East Tennessee, Virginia & Georgia Railroad, against the Knoxville & Ohio Railroad Co., which only waits the ratification of the court. Special Master Hume's report shows that the Knoxville & Ohio road is indebted to the East Tennessee, Virginia & Georgia road to the amount of \$1,800,000. By the terms of the agreement the defendant proposes to issue \$2,000,000 worth of bonds drawing 6 per cent., and with proceeds to procure and turn over to the East Tennessee, Virginia & Georgia Co., in discharge of above indebtedness, capital stock of the Memphis & Charleston road to the amount of \$2,400,000; 5 per cent. bonds of the East Tennessee, Virginia & Georgia road, Cincinnati & Georgia Division, to the amount of \$200,000, and East Tennessee, Virginia & Georgia debentures to the amount of \$600,000, which the East Tennessee, Virginia & Georgia Co. agrees to accept in satisfaction of all indebtedness. The Memphis & Charleston stock and the 5 per cent bonds above mentioned are to be deposited with the Central Trust Co., to be held as security for the holders of the 5 per cent consolidated gold bonds of the East Tennessee, Virginia & Georgia Co. This compromise prevents an order for a sale of the road, and thus cuts off the possibility of its purchase by the Kentucky Central or the Louisville & Nashville, either of which roads over it could throw a competing line into Knoxville direct."

**Evansville & Terre Haute.**—This company is considering the question of building a branch from Shelbyton or Farmersburg, in Sullivan County, Ind., to Lincoln in Green County, a distance of about 20 miles. The line, it is understood, will be built if a reasonable amount of aid is granted on the line.

**Fremont, Elkhorn & Missouri Valley.**—The extension of this road is now completed to Chadron, the crossing of White River, 140 miles west of the old terminus at Valentine, Neb. It is announced that the company has decided to finish the road this season to Rapid City in the Black Hills. Grading is now going on rapidly under contracts recently let, and the present intention is to have the tracklayers follow up the grading as closely as possible. The distance from Chadron to Rapid City is 101 miles.

**Georgia Midland.**—Meetings continue to be held in aid of this projected line from Columbus, Ga., to Atlanta, and a considerable amount of subscriptions have already been secured.

**Houston & Texas Central.**—The Receivers of this road recently asked the Court for authority to buy 10 new locomotives. The Court referred the petition to a special master, and directed that, if he found that the locomotives were needed for the operation of the road, the Receivers should be authorized to contract for them upon his report. Another petition from the Receivers for leave to buy steel rails sufficient to renew 55 miles of track on the Austin branch was also referred to a master for examination and report. The new locomotives and the steel rails, if their purchase is authorized by the Court, will be paid for by receivers' certificates.

**Kingwood & Tunnelton.**—A contract has been let to J. Barrett and F. Keever, of Pittsburgh, to build this road from the Baltimore & Ohio at Tunnelton, W. Va., to Kingwood, a distance of 11 miles. The object of the line is to reach the valuable iron mines in the Cheat River Valley.

**Lehigh & Hudson River.**—The directors of this company, in order to pay off without borrowing the large amount of car trusts maturing during the next two years, have proposed to the bondholders to fund their coupons for two years from July 1, the money thus saved to be applied to the payment of car trusts. Nearly all the bondholders have accepted the proposition.

**Mineral Range.**—This road, it is understood, has been sold to Henry S. Ives, of New York, and associates, who have taken possession. The road extends from Hancock, Mich., to Calumet, and, although only 12½ miles long, has been very profitable, as it is the connection of the extensive mines of the Calumet & Hecla Co. with Lake Superior.

**Nashville, Chattanooga & St. Louis.**—This company's statement for June and the fiscal year ending June 30 is as follows:

	June, 1885.	1884.	Year, 1884-85.	1883-84.
Earnings.....	\$147,700	\$161,956	\$2,340,719	\$2,372,086
Expenses.....	85,797	82,267	1,304,002	1,303,446
Net earnings.....	\$61,903	\$79,689	\$936,717	\$1,068,640
Interest and taxes.....			\$82,273	\$662,320
Improvements of road.....			58,401	106,077
Total charges.....			\$740,674	\$768,397
Surplus.....			\$196,043	\$300,243

This year shows a decrease in gross earnings of \$131,367, or 5.5 per cent.; in net earnings of \$131,923, or 12.3 per cent., and a decrease of \$104,200, or 34.7 per cent., in the surplus.

**Nebraska & Kansas.**—This company has been organized to build a railroad from Fairmont, Neb., south, through Geneva to Burr Oak, Kan., a distance of about 60 miles.

**New York Central and the Pennsylvania.**—The negotiations for a settlement between these companies, so far, have been in the hands of but two or three officers on each side. The number who know what has been done is small; the number who can give a shrewd guess at the result reached is large. Even yet many details await adjustment and confirmation, but the following seems to be a pretty close summing up of the situation as it is understood by competent observers.

1. The arrangement reached between the Pennsylvania and New York Central is not an alliance of interests, but a division of territory. Each has a rival less powerful; each has, or will be, paralleled, and each is to be left to deal in its way with its own local problem.

2. Vice-President Thomson and Gen. George J. Magee, acting for each interest, have arrived at an understanding which includes the transfer of the South Pennsylvania and the Beech Creek roads to the Pennsylvania Railroad for a certain sum, payable in a long-running, low-interest-bearing bond.

3. President Depew, Mr. J. P. Morgan, of New York, and Mr. A. J. Cassatt have partially arranged a plan by which the New York Central is to get control of the West Shore road. It is supposed the first step will be a receivership in the Vanderbilt interest.

4. These various arrangements and understanding do not include all that is involved in the broad term of trunk line difficulties. They do not cover the march of the Baltimore & Ohio to New York. They do not dispose of the various coal line complications, which begin with Reading, but are far from ending there. They do not settle rates, but make rates easier to settle and keep settled in the future.

Meetings of the South Pennsylvania and the Beech Creek stockholders have been called. So far as the South Pennsylvania is concerned, the Pittsburgh stockholders will probably oppose any transfer, but it does not seem likely that they can prevent it, if an agreement is reached as above.

**New York & New England.**—A destructive fire occurred at this company's car shops at Norwood Mass., on the afternoon of July 19. The fire started in the engine room, from some unknown cause, and spread to the main building, which was of brick, 350 by 75 ft., and was used as a wood machine and erecting shop. This building was entirely destroyed, as were also the blacksmith shop, 300 by 60 ft., and the foundry, also 200 by 60 ft., and the tin and roofing shop, a wooden building, was badly damaged; a great deal of valuable machinery was either destroyed or very badly injured. The total loss is estimated at \$200,000, most of it covered by insurance.

**New York, Pennsylvania & Ohio.**—Affidavits have been prepared and submitted in support of an application to have the McHenry suits against this company transferred to the United States Court, and to have the appointment of Mr. Dick, as Receiver, revoked.

We observe that in some quarters the appointment of a receiver has been treated as though the company had just gone into bankruptcy, as though the appointment would end the lease of the road to the Erie. This is not the case. The financial condition of the company is the same—no better and no worse than it has been since the last reorganization. The earnings of the road have been sufficient to pay only a very small part of the interest on its enormous bonded debt, but at the time of the reorganization provision was made for the payment of part of that interest in new bonds, and for the suspension of the rest until the earnings should be sufficient to pay. The only interest which the company is required to pay in cash is on the \$8,000,000 prior lien 6s., and that interest has always been promptly met. Moreover,

the receivership does not at all affect the lease, and as the appointment so far is only for the state of Pennsylvania, the only function of the receiver is to take such portion of the rental as may be decided to belong *pro rata* to the section of the road in that state. He has nothing whatever to do with the operation of the road, which remains entirely with the lessee.

**New York, West Shore & Buffalo.**—The foreclosure suit against this company came up in the New York Supreme Court at Newburg, July 18, in pursuance of the order of the Court. A large number of counsel were present, representing the various interests in the road. Counsel for the trustee announced their readiness to go on with the suit at once, but an appeal for delay was made by the representatives of the North River Construction Co. After considerable argument the Court finally decided not to hear the case at the present time, but to put it over until the September term, and finally, by consent of all parties, the final hearing was set for the second Monday in September.

It is reported that a large amount of this company's bonds, which had been bought in the interest of the Pennsylvania Railroad, either have or will be transferred to Mr. Wm. H. Vanderbilt, making him the largest individual holder of the bonds.

**Ohio & Mississippi.**—It is stated that a definite proposition has been made to the representatives of the English stockholders for a lease of this road by the Baltimore & Ohio. That company offers to operate the road at a rental of 40 per cent. of the gross earnings, guaranteeing a minimum of \$1,600,000 yearly. This amount would be sufficient to pay all the fixed charges and leave a small amount for stock, and, of course, if the gross earnings should run over \$4,000,000, the rental would reach a greater amount.

**Oregon Improvement Co.**—This company has completed and opened for traffic its Cedar River Extension, which leaves the Columbia & Puget Sound road near Renton, Wash. Ter., and runs southeast 24 miles to the Green River coal fields. It is of 3 ft. gauge, and is built to develop the coal district, the lands in which are chiefly owned by the company.

**Oregon Railway & Navigation Co.**—It is stated that the lease of this company's lines to the Union and Northern Pacific roads was formerly agreed to weeks ago, and that there is therefore no longer any question as to its terms, the delay in signing it being simply due to the fact that the lawyers have not as yet finished preparing the documents. The lease takes effect July 1, 1885, and is for 999 years. It provides for the conveyance of the Oregon Co. to the joint companies of everything except its corporate franchise, books, furniture and cash on hand, including all its leases, stocks and assets, and 657 miles of railroad, which are to be operated by them for their own benefit, they agreeing to pay over 2½ per cent. semi-annually on the \$24,000,000 of Oregon Railway & Navigation Co. stock up to and including July 1, 1888, and 3 per cent. semi-annually thereafter during the life of the contract. Of the 5 per cent. general mortgage bonds, which have been authorized on the 657.3 miles of road to the extent of \$25,000 per mile, there are reserved \$6,000,000 to take up and cancel the \$1,200,000 first-mortgage bonds of the Oregon Railway & Navigation Co., a like amount of scrip and \$6,000,000 for the redemption of the debenture bonds. Provision is also made for the satisfaction of other claims, including the Oregonian Railway lease, the claim of the Oregon & Transcontinental Company for \$150,000 for the Texas Ferry grade, the Bethlehem Iron Works claim, the Spencer Irving suit, and for the purpose of making needed improvements, an additional \$1,000,000 of bonds being devoted to these uses. Extensions may be built to the company's lines through the issue of these general mortgage bonds, such issue being limited, however, to \$25,000 per mile.

**Philadelphia & Reading.**—A writer in the Philadelphia *Inquirer* has made a calculation in which the total losses of the Reading Co. on account of its lease of the Jersey Central are summed up as follows:

Loss on stock speculation.....	\$1,479,600
Commissions and interest to brokers carrying stock.....	400,000
Loss in operating.....	1,340,749
Discount on Jersey Central bonds.....	840,000

Total.....\$4,060,349

"The most ruinous operation in connection with the lease," the writer says, "was the disastrous speculation in stock. The Reading Company bought 50,100 shares of Jersey Central stock on a margin through various brokers in Philadelphia and New York. The average price was \$78.05 per share, but of this the Reading paid down only a small percentage, paying interest on the balance with the brokers. It required several months to collect 50,000 shares, and the whole block was carried for more than a year. What the interest paid amounted to is not known, but in a speculation requiring nearly \$4,000,000, where 90 per cent. is borrowed, and the operation extends over two years, the interest account is certainly considerable. However, the stock purchased at \$78.05 was sold, or at least 49,100 shares were sold, at an average price of \$55.95 per share. This is a loss of \$22.10 per share, which, on 49,100 shares amounts to \$1,085,100. The remaining 1,000 shares cost \$780,500, and yesterday they could have been bought for \$395,000."

**Pittsburgh & Western.**—An order has been filed in the United States Circuit Court in Pittsburgh which will continue the road for the present in the possession of the Receiver. The court granted the order by consent of the trustee under the first mortgage and on representation to the effect that, if the receivership be continued for a short time, the earnings of the road will enable the company to pay off its indebtedness and resume payment of interest on the bonds.

**Poughkeepsie, Hartford & Boston.**—Surveys are in progress for the extension of this road from its present terminus at Ancram, N. Y., through Copake and Egremont, to Great Barrington, Mass., a distance of about 20 miles. The road has at present a very small local traffic, and has no through business or connections. It is thought that the extension will obtain for it a considerable traffic in coal and other freight to and from the factories at Great Barrington, which are now entirely dependent on the Housatonic road. A further extension, either on the graded road-bed of the Lee & Hudson road, or directly westward to Westfield, is also proposed. The 20 miles from Ancram to Great Barrington can be built at a moderate cost, as there is no difficult work on the line, and would probably make the road a much more valuable property than it is at present.

**Raleigh & Gaston.**—A suit has been begun in the Superior Court of Wake County, N. C., by W. D. Addison, who holds as trustee 105 shares of this company's stock, asking an injunction and account and decree that the earnings of the road shall be applied to the payment of dividends. The bill charges that the Raleigh & Gaston Co. has been managed by its directors entirely in the interest of the Seaboard & Roanoke Co., which owns a majority of the stock, and to the great detriment of the minority stockholders. Mr. John M.



Robinson, President of the company, is also President of the Seaboard & Roanoke Co. The bill further charges that \$47,791 of Raleigh & Gaston earnings have been expended in the purchase of stock of the Carolina Central Co., which, the complainants say, is of no use to the Raleigh & Gaston; that only 3 per cent. dividends have been paid, when the earnings are sufficient to pay 4 per cent. additional; that the President and certain directors have conspired to depress the stock of the Raleigh & Gaston, so as to buy it in at nominal figures, and have concealed the operations of the company, refusing information and declining to show even the list of stockholders. The Court passed an order for the production of the books of the company by W. W. Vass, of Raleigh, Treasurer, and to show cause why an injunction should not issue restraining the use of the funds of the company for purposes not contemplated in the charter.

**Rochester & Pittsburgh.**—A branch of this road is to be built from Reynoldsville, Pa., to Falls Creek, a distance of 7 miles. The branch will be built by the coal firm of Bell, Lewis & Yates, of Buffalo, who own a large coal property at Falls Creek.

An injunction has been issued to prevent the sale of this road under the decree of foreclosure. It is temporary only and is issued at the suit of H. H. Warner and E. P. Olmstead, stockholders, who claim that the sale is unnecessary.

**Rome.**—At the annual meeting of the stockholders of this company a committee was appointed to consider the question of extending the road to Decatur, Ala. The committee is instructed to confer with the directors of the Georgia Railroad Co. and to report to an adjourned meeting.

**Rome & Carrollton.**—The contractors on this road commenced work July 14 on the line from Rome, Ga., to Cedartown, and a large force is already employed. The work is to be pushed as fast as possible, and tracklaying will be begun as soon as a sufficient section of the grade is finished, the intention being to have the road in operation in time to carry the cotton of the present year's crop.

**Rome Watertown & Ogdensburg.**—This company makes the following statement for the eight months of its fiscal year from Oct. 1 to May 31:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Earnings	\$1,078,486	\$1,040,599	I. \$37,887	3.6
Expenses	707,435	683,207	I. 24,228	3.5
Net earnings	\$371,051	\$357,392	I. \$13,659	3.8
Rents	4,337	5,156	D. 819	16.3
Total	\$375,388	\$362,548	I. \$12,840	3.5

The earnings and expenses increased in very nearly the same proportion. The fixed charges are about the same this year as last.

**Schuylkill & Middleton Canal.**—This company has been organized by the bondholders who purchased the old Union Canal recently at foreclosure sale. The controlling interest in the new company is held by the Philadelphia & Reading. Under the agreement each holder of a \$500 bond receives one share of the stock of the new company.

**Southern Pacific.**—It is announced that hereafter no separate statements of earnings will be furnished for the roads operated by this company. Monthly statements will be issued, giving the gross and net earnings of the Pacific system and the Atlantic system. The Pacific system includes the Central Pacific and the Southern Pacific, of California, New Mexico and Arizona. The Atlantic system will include the Galveston, Harrisburg & San Antonio, the Texas & New Orleans, the Louisiana Western, and Morgan's Louisiana & Texas.

For the month of May the gross earnings for the Pacific system were \$1,682,635, the expenses \$814,953, and the net earnings \$867,682.

**Texas & St. Louis.**—A number of the security holders met in the office of the Central Trust Co., in New York, July 16, to discuss measures for the protection of their interests. J. W. Paramore presided. Remarks were made by Receiver Fordyce, who said that the narrow gauge of the road, low freight rates, and the drought during the past three years, had all worked against the prosperity of the road. He recommended that the road be changed to standard gauge, in order that it might be enabled to compete with other roads. The estimated cost of changing the gauge is \$2,500,000. One plan suggested is to issue first-mortgage bonds for the purpose of raising the money necessary to change the gauge and extend the line northward. George Coppell, William Mertens, J. W. Paramore, Edward A. Price and Mr. Marcus were appointed a committee to consider a plan and report at an adjourned meeting.

The adjourned meeting was held in New York, July 20, when the special committee appointed at the previous meeting presented a statement and an outline of a plan of reorganization. The committee stated that it would be necessary to raise about \$2,500,000 to pay off the receiver's certificates and debts and put the road in good working order. The meeting accepted the report and referred it to a new special committee, consisting of J. W. Paramore, George Coppell, William Mertens and Louis S. Wolff. The new committee was given full power to perfect a plan of reorganization, prepare an agreement between the parties in interest and procure signatures to the same.

The Receiver, who was present, stated that there was immediate need of money to put the equipment in suitable condition to carry the business which might be expected this fall, as there were large crops all along the line, and he suggested that the bondholders might come to his assistance, as the court would not permit him to make any further expenditures in excess of the earnings of the road. It was resolved by the meeting that, if possible, arrangements should be made to have the sale of the Texas Division postponed for 60 days.

**Troy & Greenfield.**—The operating expenses of the Troy & Greenfield railroad and Hoosac Tunnel for the month of June were \$18,270. During the same month there was received from the Fitchburg railroad for March tolls \$20,381. Troy & Boston January tolls \$944, and Boston, Hoosac Tunnel & Western tolls for the month of February, \$1,731. The tolls collected last October from all the operating roads aggregated \$28,095, with operating expenses of \$23,782. The net income for the month was \$4,313. In November tolls footed up \$23,232, and operating expenses \$22,828, leaving net only \$404. In December, with tolls of \$22,984, and expenses of \$19,905, the surplus for the month was \$3,079. Total surplus earnings Oct. 1 to Dec. 31, 1884, \$7,796.

**Union Pacific.**—This company's land sales for June and the half-year to June 30 were:

	June.		Half-year.	
	Acres.	Amount.	Acres.	Amount.
Union Div.	84,726	\$131,382	313,433	\$553,457
Kansas Div.	75,509	351,612	338,358	1,338,966
Total	160,235	\$482,994	651,791	\$1,892,423

As compared with 1884 the half-year shows a decrease of 1,005,786 acres and of \$3,211,545 in the amount received.

**Utica, Clinton & Birmingham.**—The litigation between this company and the New York Central in the New

York Supreme Court is ended for the present by decision of the court granting the application of this company for a commission to appraise the value of the right of way for a crossing over the Central tracks. The crossing is to be overhead by a bridge.

**Wabash, St. Louis & Pacific.**—In the United States Circuit Court in St. Louis, July 15, a final order was made directing the Receivers to turn over the Quincy, Missouri & Pacific to the trustees under the first mortgage on that road, who have been prosecuting the proceedings in foreclosure for some months past. The road extends from Quincy, Mo., to Trenton, 134 miles.

The Receivers give notice that they have arranged to pay \$105,000 overdue interest on the St. Louis, Kansas City & Northern real estate bonds on Aug. 1, and \$30,000 interest on St. Charles Bridge bonds Aug. 15. The Receivers will make efforts to pay the interest on North Missouri firsts early in September.

**Wisconsin Central.**—A Chicago dispatch of June 22 says that the right of way into the city for the extension of this road has been obtained and work is to be begun at once.

## ANNUAL REPORTS.

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## Central Pacific.

The following table shows the gross earnings of the road owned by the Central Pacific and of each of its leased lines, and the net profit (or loss) to that company, after deducting operating expenses and rentals, and was accidentally omitted from the summary of the annual report published last week:

	Gross earnings.	Net profit Cen. Pac.
	1883.	1884.
Central Pacific	\$13,149,402	\$11,826,901
Amador Bra'h.	30,772	49,863
California Pac.	1,290,351	1,236,223
Galv., Har. & S. A.	3,171	55,870
Los Angeles & San D.	75,460	72,533
Los Angeles & Indep.	32,773	39,658
Sac. & Placer-ville	26,353	29,922
Stock & Copper	112,847	129,237
Northern Ry.	1,917,588	1,927,376
S. Pablo & Tulare	720,589	807,448
So. Pac. of Cal.	3,880,065	3,240,943
Colo. Div.	259,862	299,432
So. Pac. of Ariz.	2,445,429	1,821,917
So. Pac. of N. Mex.	790,756	694,653
Total	\$24,744,421	\$22,106,106

\* Loss.  
The Galveston, Harrisburg & San Antonio was worked temporarily and only for a very short time in 1883. The Colorado Division of the Southern Pacific was transferred to the Atlantic & Pacific Co. Oct. 1, 1884.

## Rutland.

This company owns a line from Bellows Falls, Vt., to Burlington, 120 miles, and leases the Addison road, from Leicester Junction, Vt., to Ticonderoga, N. Y., 16 miles. The whole property is leased to the Central Vermont Co. at a yearly rental of \$258,000. The report for the year ending June 30 relates only to the financial affairs of the company and has no statements of the traffic or earnings of the road.

The balance sheet, condensed, is as follows:

Common stock	\$2,480,000
Preferred stock	4,000,000
Funded debt	5,002,100
Accounts and balances	14,456
Profit and loss	104,075
Total	\$9,001,231

Construction and bond accounts	\$9,005,621
Real estate	115,896
Addition R.R. stock	332,800
Deficit in cash account	45,045
Accounts receivable, etc.	54,942
Cash	46,887
Total	\$9,601,231

The funded debt includes \$1,500,000 first-mortgage 6s; \$1,500,000 second-mortgage 5s and \$2,100 old equipment bonds, not presented for payment.

The income account, condensed, is as follows:

Cash on hand, July 1, 1884	\$17.41
Central Vermont Co., rental account	252.86
Dividends, interest, etc.	14.33
Temporary loan, less discount	68.57
Total	\$353.191
Interest	\$103.811
Dividends, preferred stock	40,000
Addition R. R. rent	15,000
Temporary loan paid	69,000
Expenses, taxes, etc.	18,493
Total	306,304

Balance, cash, June 30, 1885 \$46,887  
A dividend of 1 per cent. on the preferred stock was paid in July, 1884.

The report says: "The item of interest received on money loaned is the first shown by the books of the company in its entire history. Though small, it is an encouraging sign, and it is hoped, marks a transition from an era of interest paying to one of interest receiving. The payment of the Austin judgment \$1,921, terminates a long outstanding litigation in respect to the acquisition by the corporation of the title to certain lands in the city of Burlington, over which the road extends, and secures to the corporation the title in question."

## Wilmington & Northern.

This company owns a line from Wilmington, Del., to High's Junction, Pa., 70.5 miles; the French Creek Branch, from Springfield, Pa., to St. Peter's, 5.9 miles; the Rockland Mill Branch, from Dupont, Del., to Rockland, 1 mile; the Christiana Avenue Branch in Wilmington, 1.87 miles; the South Walnut Street Branch in Wilmington, 1.07 miles; the Water Street Branch in Wilmington, 1 mile; the Kentmere Branch, 2.77 miles, and the Delaware Extension, from Wilmington to the Delaware River, 3.5 miles—a total of 87.11 miles. It also leases the use of the Schuylkill & Lehigh track from High's Junction into Reading, 2.418 miles.

During the year the Kentmere Branch was extended 0.91 mile, and the Water Street Branch 0.47 mile, a total increase of 1.38 miles.

The equipment includes 17 locomotives; 10 passenger, 1 baggage and 6 combination cars; 46 box, 1 stock, 67 gondola, 6 line and 5 caboose cars; 12 construction cars.

The general account, condensed, is as follows:

Stock	\$1,278,050
Funded debt	244,200
Accounts and balances	36,339
Profit and loss	280,801
Total	\$1,839,390
Road and equipment	\$1,772,729
Materials	20,058
Accounts and balances	37,058
Cash	9,545
Total	1,839,390

The funded debt consists of \$228,700 branch bonds and \$15,500 bond and mortgage on real estate. There were \$27,700 bonds sold and \$5,300 redeemed last year, a net increase of \$21,700.

The traffic for the year was as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Train miles	199,756	192,860	I. 6,896	3.6
Passenger	159,059	144,019	I. 14,550	10.1
Freight	97,970	78,250	I. 21,720	28.6
Service and switch	456,785	413,719	I. 43,066	10.4
Total	1,450,570	1,328,648	I. 121,922	9.2
Passengers carried	3,149,036	2,791,822	I. 357,214	12.8
Passenger-miles	536,789	548,014	D. 11,225	2.0
Tons freight carried	14,850,792	13,284,915	I. 1,565,877	11.8
Ton-miles	15.8	14.5	I. 1.3	8.9
At. train load	93.4	91.9	I. 1.5	1.6
Freight, tons	2.11 cts.	2.25 cts.	D. 0.14 ct.	6.2
At. rate	1.83	2.08	D. 0.25	12.0

The average passenger train was 2½ cars; the average freight train 29½ cars. Freight trains cost 81.07 cents per mile run. The average passenger journey was 11.77 miles; the average freight haul 27.67 miles.

The earnings for the year were:

	1884.	1883.	Inc. or Dec.	P. c.
Freight	\$271,193	\$276,516	D. \$5,323	1.9
Passengers	68,682	62,682	I. 5,999	9.6
Mail, etc.	8,234	8,083	I. 151	1.8
Total	\$348,056	\$345,281	I. \$2,775	0.8
Expenses	281,603	281,932	D. 329	0.1

Net earnings	\$64,453	\$63,349	I. \$1,104	1.7
Gross earn. per mile	3.978	4.134	D. 0.156	3.8
Net	741	778	D. 37	4.7
Per cent. of exps.	81.4	81.2	I. 0.2	0.2

Expenses include taxes; also 621 tons of steel rails and many other improvements of the road.

The disposition of net earnings was as follows:

Net earnings as above	\$64,453
Interest on bonds	\$11,457
Redemption of branch bonds	5,300
Total	16,757

Balance surplus for the year \$47,696

From this balance the sum of \$32,296 was expended for new equipment, real estate and improvements of the road.

The changes in road-bed at several points under agreement with the Pennsylvania Schuylkill Valley road have been completed.

The decrease in earnings was very small, notwithstanding the general depression in business. The passenger train service yielded a profit for the first time in the history of the road.

## Ogdensburg & Lake Champlain.

This company owns a line from Ogdensburg, N. Y., to Rouse's Point, 122 miles, and leases (since December, 1883) the Lamont Valley Extension road, from Rouse's Point to Swanton, N. Y., 12½ miles. It is controlled by the Central Vermont Co., which acquired a majority of the stock two years ago. The report is for the year ending March 31.

The road carried last year 373,184 tons of freight, against 361,322 tons the preceding year, an increase of 11,862 tons, or 3.3 per cent.

The earnings for the year were:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Earnings	\$616,815	\$623,377	D. \$6,562	1.1
Expenses	398,540	418,826	D. 20,286	4.8
Net earnings	\$218,275	\$204,551	I. \$13,724	6.7
Gross earn. per mile	4.593	4.987	D. 0.394	7.8
Net	1,636	1,636	D. 0	0.0
Per cent. of exps.	64.6	67.2	D. 2.6	3.9

The result of the year was as follows:

Net earnings, as above	\$218,275
Interest on bonds	\$167,800
Interest on floating debt	34,677
Total	202,477

Balance, surplus for the year \$15,798

During the year the usual renewals of track have been made, and the work of replacing iron rails with steel was



continued. The improvements of the elevator at Ogdensburg were completed, and 500 ft. of wharf there were rebuilt in a substantial manner.

#### Montpelier & Wells River.

This company owns a line from Montpelier, Vt., to Wells River, 38 miles. Its report is for the year ending March 31. The equipment consists of 3 locomotives; 4 passenger, 1 combination and 2 baggage and mail cars; 24 box, 6 stock, 33 flat cars and 1 caboose; 1 snow-plow and 1 derrick car.

The company has no bonded debt. Its total debt at the close of the year amounted to \$54,350, of which \$42,350 is for equipment and interest thereon; \$2,000 for real estate, and \$10,000 temporary loan. It was increased last year by the temporary loan and \$2,210 interest on equipment, and decreased by \$1,000 paid on real estate; a net increase of \$11,210.

The earnings for the year were:

	1884-85.	1883-84.	Inc. or Dec.	P. c.
Freight	\$57,053	\$58,013	D. \$960	0.6
Passengers	30,116	27,049	I. 3,067	11.3
Mails, etc.	5,045	7,124	D. 2,081	29.7
Total	\$92,814	\$92,188	I. \$626	0.7
Expenses	110,589	85,845	I. \$24,744	28.8
Net or deficit	D. \$17,775	N. \$6,343	D. \$24,118	
Gross earn. per mile	2,442	2,426	I. 16	0.7
Net " "	119.2	93.1	I. 26.1	

Expenses last year included \$53,180 for new steel rails and \$2,586 for new ties.

The income statement is as follows:

Deficit for the year	\$17,775
Paid on account of real estate	1,000
Total	\$18,775
Surplus from previous year	\$17,078
Sale of old iron rails	10,309
Temporary loan	10,000
Total	\$37,387

Balance, surplus

This surplus is represented by \$8,019 supplies on hand and paid for; \$6,208 balances due from other roads and \$4,385 cash and cash vouchers; making up a total of \$18,612 as shown.

#### St. Louis, Alton & Terre Haute.

The company operates a line from East St. Louis, Ill., to Eldorado, 121 miles, with a branch from Belleville to East Carondelet, 17.3 miles, making 138.3 miles in all. This line is made up of the Belleville Branch, owned, East St. Louis to Belleville, 14.4 miles; the Belleville & Southern Illinois, Belleville to Du Quoin, 56.4 miles; the Belleville & Eldorado, Du Quoin to Eldorado, 50.2 miles, and the Belleville & Carondelet, Belleville to East Carondelet, 17.3 miles. The last named road was leased from June 1, 1883. The report is for the year ending Dec. 31.

The company also owns a main line from East St. Louis to Terre Haute, Ind., 189 miles, with a branch to Alton, Ill., 4.2 miles, this line being leased to the Cleveland, Columbus, Cincinnati & Indianapolis Co., as owner of the Indianapolis & St. Louis road.

The equipment of the line worked includes 18 locomotives; 12 passenger, 2 baggage and 2 mail cars; 210 box, 15 refrigerator, 25 stock, 41 flat and 600 coal cars.

The general account, condensed, is as follows:

Common stock	\$2,300,000
Preferred stock	2,468,400
Funded debt	8,357,000
Sinking fund	655,000
Accounts and balances	353,241
Income account, balance	750,492

Total

Capital stock account	\$13,125,400
Trustees of sinking fund	655,000
Lesses	569,914
Other accounts	533,819

The funded debt consists of \$2,200,000 first-mortgage bonds; \$2,800,000 preferred second-mortgage bonds; \$1,700,000 income second-mortgage bonds; \$300,000 equipment bonds, and \$1,357,000 dividend bonds. The sinking fund holds \$636,000 bonds and \$159,832 cash.

The traffic for the year on the line worked was:

	1884.	1883.	Inc. or Dec.	P. c.
Passengers carried	255,611	278,303	D. 22,692	8.1
Passenger miles	7,007,196	7,374,237	D. 367,041	5.0
Tons freight carried	372,632	335,007	I. 37,625	11.2
Ton-miles	23,329,109	20,557,590	I. 2,771,519	13.5
Coal ton carried	380,334	400,530	D. 20,200	5.0
Coal ton-miles	10,912,453	13,227,801	D. 2,315,348	17.5

At rate:

Per passenger-mile	2.410 cts.	2.430 cts.	D. 0.020 ct.	0.8
Per freight ton-mile	1.539 cts.	1.618 cts.	D. 0.079 ct.	4.8
Per coal ton-mile	1.477 cts.	2.025 cts.	D. 0.548 ct.	27.1

The total freight exchanged with the Illinois Central at Du Quoin was 272,344 tons, of which 253,619 tons were through freight between St. Louis and Cairo.

The earnings of the line worked were:

	1884.	1883.	Inc. or Dec.	P. c.
Freight	\$359,192	\$332,644	I. \$26,548	8.0
Coal	161,183	267,932	D. 106,749	39.8
Passengers	168,721	178,968	D. 10,247	5.7
Mail, etc.	52,054	52,924	D. 870	1.6
Total	\$741,150	\$832,468	D. \$91,318	10.9
Expenses	406,160	425,635	D. 19,475	4.6
Net earnings	\$334,990	\$406,833	D. \$71,843	17.6
Gross earn. per mile	5.358	6.421	D. 1.063	16.6
Net " "	2.437	3.138	D. 701	22.6
Per cent. of exps.	54.8	51.1	I. 3.7	

The chief loss was, as shown above, in the earnings on the coal business. Taxes are included in expenses.

The gross earnings of the main line, as reported by the lessee, were:

	1884.	1883.	Decrease.	P. c.
Freight	\$886,250	\$1,028,980	\$142,730	13.9
Passengers	338,441	353,978	15,537	4.4
Mail, etc.	99,234	101,111	1,877	1.8
Total	\$1,323,925	\$1,484,069	\$160,144	10.8
Per mile	6,853	7,682	827	10.8

The lessee has made punctually all payments required, and has also made extensive improvements to the road.

The result of the year was as follows:

Net earnings line worked	\$334,990
Rental main line	450,000
Interest, old accounts, etc.	18,486
Total	\$803,476
Interest paid	\$469,000
Rentals	203,971
Main line and legal expenses	13,515
New equipment	4,560
Dividends on preferred stock, 4 1/2 per cent.	111,078
Total	\$802,124
Surplus for the year	\$1,352

The loss in earnings of the line worked was due entirely to local causes, and largely to the breaking up of the St. Louis

coal pool, by which rates were brought down to a very low point for over four months.

The road was kept in good condition; 250 tons steel rails and 51,161 new ties were used in renewals. About 3 1/2 miles of heavy steel rails are still needed to bring the track up to the standard.

#### Pittsburgh, Fort Wayne & Chicago.

This company owns a line from Pittsburgh to Chicago, 468 miles, which is leased to the Pennsylvania Co., at a rental equivalent to interest on all obligations and 7 per cent. on the stock. The present report, for the year 1884, is made by the lessor company, the lessee furnishing statements of earnings.

The general account, condensed, is as follows:

Capital stock	\$19,714,286
Guaranteed special stock, issued for betterments	8,400,000
Funded debt	12,510,000
Interest and dividends due and accrued	603,219
Due lessee for betterments	2,378,816
Income account, balance	4,004,480
Total	\$47,608,801
Road and equipment	\$42,065,237
Supplies transferred with lease	468,725
Bonds in sinking fund, cost	4,001,051
Cash in sinking fund	386,849
Cash to pay dividends and interest	604,780
Cash accounts	22,159
Total	47,608,801

The funded debt consists of \$5,250,000 firsts, \$5,160,000 seconds, \$2,000,000 thirds and \$100,000 construction bonds. The \$1,000,000 equipment bonds, which matured March 1, 1884, were paid off by the lessee and have disappeared from the account.

The sinking fund trustees now hold \$1,567,500 firsts and \$1,816,500 seconds, besides \$386,849 in cash. Purchases last year were \$104,000 firsts and \$121,000 seconds, these \$235,000 bonds having cost \$311,838. The \$3,384,000 bonds now held by the trustees have cost \$4,001,051, a premium of about 18 per cent.

The earnings for the year were:

	1884.	1883.	Inc. or Dec.	P. c.
Freight	\$6,111,217	\$7,432,479	D. \$1,321,262	17.8
Passengers	2,480,410	2,798,580	D. 318,170	12.0
Mail and express	321,487	337,838	D. 16,351	4.8
Rents, etc.	270,927	277,490	D. 6,563	2.3
Total	\$9,184,041	\$10,846,387	D. \$1,662,346	15.5
Expenses	6,034,889	6,916,669	D. 881,780	12.7
Net earnings	\$3,149,152	\$3,929,718	D. \$780,566	20.3
Gross earn. per mile	19.381	23.172	D. 3.791	15.5
Net " "	6.686	8.332	D. 1.646	20.3
Per cent. of exps.	65.9	63.8	I. 2.1	

The earnings were affected by the low rates and general depression and disturbance of traffic which have diminished the earnings of all lines carrying through traffic.

The income account is as follows:

Net earnings, as above	\$3,149,152
Gain on operation of New Castle & Beaver Valley	33,472
" " Lawrence R. R.	6,801
Total	\$3,189,425
Less allowed Cleveland & Pittsburgh, joint earnings	201,960
Net balance	\$2,987,465

Interest on bonds	\$915,700
Organization, etc.	19,000
Dividends, 7 per cent., on regular stock	1,380,000
" " " special stock	588,000
Sinking fund payments	104,100
Total	3,006,800
Apparent loss to lessee	\$99,335

As the lessee receives the dividends on special stock, this apparent loss becomes an actual gain of \$488,665.

The directors' report refers at length to the close of the litigation with the lessee in respect to the issue of guaranteed special stock, which has been heretofore noted, and again mentions the proposed plan for the exchange of stock for 7 per cent. permanent bonds. The report says that unless stockholders take more interest nothing can be done.

The betterment account stands as follows:

Total betterments to Dec. 31, 1882	\$9,300,084
for 1883 and 1884	1,383,732
Total	\$10,776,816
Special stock issued to Dec. 31, 1882	\$8,400,000
Jan. 23, 1885	1,226,700
Total	9,626,700

Balance, since issued

Total	\$1,150,116
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The Consulting Engineer's report gives the equipment as follows: 285 locomotives; 152 passenger, 5 postal and 59 baggage cars; 3,378 box, 1,742 stock, 2,035 flat and 162 caboose cars.

This report mentions the building of new car shops just outside of Fort Wayne and the addition of the old car shops to the locomotive shops at that point, and says: "The track is gradually being improved by stone ballast, replacing present rails with those of heavier pattern, replacing wooden bridges and culverts with iron and stone structures, strengthening the older iron bridges or replacing them with stronger, preparing the road, as rapidly as consistent with economy, for the heavier equipment which is being placed on it. No more double track has been undertaken; the amount shown in summary as expended being for the completion of that piece from Orrville to a point west of Wooster, mentioned in last report. The amount expended on third and fourth tracks is in the city of Chicago, and extending a short distance west of Allegheny. The lessee has deemed it better economy to have abundant terminal facilities, with frequent sidings, than to push the double track, and to that end has largely increased the track room at Allegheny, Fort Wayne and Chicago, and is adding each year additional sidings, and lengthening such of the older ones as can eventually be used for a second track.

Additional sidings have been put in at Leetonia, Alliance, Canton, Wooster, Mansfield, Crestline, Lima, Robinson, Washington, Pierceton, Grovertown, Hanna, South Chicago and Grand Crossing. The terminal facilities at Allegheny and Chicago have been largely increased, and more property has been recently purchased in both places for still further addition to track room. There can be no question as to the economy of this plan. The efficiency of the single track has been increased to such an extent that freight blockades, which were so frequent on the road, now rarely occur. Double track can now be added as absolutely required, and at such points as the operation of the road shall demonstrate to be of most advantage.

The additions the past two years are a combined passenger and freight house at Lakeville, and a freight house at Bucyrus. A number of small depots are still needed at local stations, requisitions for most of which have been approved, and will probably be erected in the near future.

A large proportion of the expenditure for real estate is for property in the cities of Allegheny and Chicago, for additional track room, and a large tract of land near Freedom, about 20 miles west of Allegheny, for a freight yard. As it

is impossible to get any additional land in Allegheny adjacent to your property except at an unreasonable outlay, and as more track room will, undoubtedly, soon be needed at that end of the road, it was deemed economy to purchase now, when it could be had at a reasonable cost, sufficient land for such track room as might be required in the future. The tract purchased was at the nearest point to Allegheny where land could be had in the desired quantity, and suitable for a freight yard. This tract can be graded, and tracks added as needed for more track room, and is a valuable addition to your property. The property, generally, has been kept in good condition."

#### Shenandoah Valley.

This company owns a line from Hagerstown, Md., to Roanoke, Va., 238.11 miles, with 17.24 miles of short branches to mines; a total of 255.35 miles of road, on which there are 24.40 miles of sidings. The report is for the year ending Dec. 31.

During the year there were added two short branches, (Smith Ore bank and Virginia Fire Brick Co.), 2.13 miles, and 0.24 mile of sidings. On the main line 162.77 miles are laid with steel and 75.34 miles with iron rails.

The equipment includes 41 locomotives; 18 passenger, 4 combination and 8 baggage, mail and express cars; 276 box, 248 stock, 247 coal and 9 caboose cars; 3 tool and 25 gravel cars; 45 hand and 42 push cars. There are also 426 trucks used in transferring cars of 5-ft. gauge to this line, which is of standard gauge.

The general account, condensed, is as follows:

Stock (\$14.495 per mile)	\$3,696,200
Funded debt (\$34,835 per mile)	8,883,000
Car-trust warrants	816,941
Bonds and stocks owned	1,068,000
Loans from Norfolk & Western Co.	335,000
Other accounts and balances payable	392,788
Total	\$14,123,929

Road and equipment	\$11,440,865
Car-trusts	816,941
Car-trust warrants	30,631
Materials on hand	1,068,000
Cash and accounts receivable	47,984
Income account, debit balance	719,508
Total	\$14,123,929

The funded debt includes \$4,113,000 general mortgage, \$2,270,000 first-mortgage and \$2,500,000 income bonds. This does not include \$1,560,000 unissued firsts, which are held by the trustees under the general mortgage. The company owns \$119,000 general mortgage bonds, pledged as collateral, and \$910,000 incomes, of which \$559,000 are pledged as collateral with the Norfolk & Western Co. and \$60,000 with other parties.

The net floating debt (excluding \$335,000 due the Norfolk & Western Co. for advances) is \$334,915. The total car-trust obligations (principal and interest) issued were \$1,275,609, of which \$460,128 had been paid up to the time of the receivership (March 31, 1885), leaving \$815,481 outstanding.

The traffic for the year was:

	1884.	1883.	Inc. or Dec.	P. c.
Train-miles	372,083	375,374	D. 3,291	0.8
Passenger	422,005	422,005	D. 124,506	29.5
Freight	297,499	102,962	D. 13,040	12.7
Service and switch	80,846			
Total	750,468	900,305	D. 140,837	15.6
Pass-car miles	1,392,714	1,479,056	D. 86,342	6.2
Freight-car miles	4,329,665	5,279,104	D. 949,439	18.0
Passengers carried	180,372	187,150	D. 6,778	3.6
Passenger-miles	7,968,718	8,014,025	D. 15,307	0.2
Tons freight carried	394,710	417,833	D. 23,123	5.6
Ton-miles	37,949,530	46,321,679	D. 8,372,149	18.1
At train load				
Passengers, No.	21.5	21.4	I. 0.1	0.5
Freight, tons	127.6	109.8	I. 17.8	16.2
At rate:				
Per pass.-mile	3.297 cts.	3.306 cts.	D. 0.009 ct.	0.3
" " net	0.281 "	0.297 "	D. 0.016 "	5.4
Per ton-mile	1.262 "	1.273 "	D. 0.011 "	0.9
" " net	0.282 "	0.264 "	D. 0.018 "	22.5

Locomotive service cost 16.64 cents per mile run last year. The average passenger train was 4 cars, and the average freight train 14.6 cars; the consumption of coal being 12.1 lbs. per passenger-car mile, and 7.3 lbs. per freight-car mile. In 1883 the coal consumption was 7.1 lbs. per freight-car mile, but on the other hand the average freight-car load increased from 8.425 tons in 1883 to 11.003 tons in 1884. The average passenger journey last year was 44.35 miles; the average freight haul 96.10 miles. The earnings per passenger train mile were 71.80 cents; expenses, 78.31; loss, 6.51 cents. The earnings per freight-train mile were 133.92; expenses, 91.08; net, 42.84 cents.

The earnings for the year were:

	1884.	1883.	Inc. or Dec.	P. c.
Freight	\$459,442	\$563,035	D. \$103,593	18.4
Passengers	197,802	209,720	D. 11,918	5.7
Other	85,127	81,660	I. 3,467	4.2
Total	\$742,371	\$854,415	D. \$112,044	13.1
Expenses	613,015	602,158	D. 10,857	7.4
Net earnings	\$129,356	\$192,257	D. \$62,901	32.8
Gross earn. per mile	2.920	3.373	D. 4.53	13.4
Net " "	509	760	D. 251	33.0
Per cent. of exps.	82.6	77.5	I. 5.1	

The expenses for motive power were reduced by the use of heavier freight locomotives and by a cheaper and better coal supply. Expenses for maintenance of way increased, chiefly in repairs of trestles and bridges. Earnings were diminished by the general depression of business and by the falling off in through freight, chiefly in iron ore.

Renewals included 771 tons steel rails, 438 tons iron rails, and 23,905 new ties. The iron rails now in the track will need renewal soon.

The income account was as follows: